

PRELIMINARY DRAINAGE REPORT

FOR

**Northeast Baseball Complex
Wichita, Kansas**

May 2007



Public Works, Engineering Division Final Drainage Plan Submittal Checklist

Reviewer: _____	Date: _____
Subdivision Name: _____	Location: _____
Total Land Area Of Ownership: _____ Acres	
Type: _____ Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other	
Applicant: _____	Contact: _____ Phone #: _____
Engineer: _____	Contact: _____ Phone #: _____

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Site Location Map, using USGS Map					
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain					
C. Discussion of offsite conditions					
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series					
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design					
F. Copy of the plat					
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)					
H. Professional Engineer seal, signature and date on cover of report					
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover					

Tab 2. Existing Conditions Runoff Calculations	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)					
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)					
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)					
D. Total Site Area and Total Impervious Area (acres)					
E. Benchmarks used for site control					
F. Streams, creeks, and waterway labeled					
G. Predominant soils from USDA soil surveys, and/or on site soil borings					
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted					
I. Location of existing roads, buildings, parking lots and other impervious areas.					



J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements					
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow					
L. Flow paths					
M. Location and dimensions of existing channels, bridges or culvert crossings					
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration					
O. Assumed pre-developed runoff curve numbers					
P. Existing time of concentrations used in calculations					
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site					
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)					
S. Cross-section data for open channels					
T. Ground water elevations, if applicable					

Tab 3. Post-Development Hydrologic Analysis	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)					
B. Proposed time of concentrations used in calculations					
C. Assumed post-developed runoff curve numbers					
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)					
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration					
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities					
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary					
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)					
I. Design water surface elevations and normal pool elevation for ponds.					
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.					
K. Proposed limits of clearing and grading					
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.					
M. Location of existing and proposed utilities (e.g., water, sewer) and easements					
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow					
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings					



P. Preliminary selection and location of stormwater controls					
Q. Emergency overflow structure's flow path					
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)					
S. The 100-year 24-hour HWL delineated on the plan for detention pond					
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds					
U. Stormwater Management Facilities located within a Reserve					
V. Maintenance responsibility of stormwater management facility shall be specified in the platters text. (e.g. HOA, Lot Owners Association, or lot)					
W. Off-site drainage easements or agreements required, where necessary					

Tab 4. Floodplain Submittal	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Provide source of flood profile					
B. Nearest base flood elevations					
C. Delineation of pre-developed regulatory floodplain/floodway limits					
D. Delineation of post-developed regulatory floodplain and floodway limits					
E. Floodplain boundary determination per elevation (project limits shown)					
F. Provide source of floodway data table and discharges					
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits					
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions					
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)					
J. Flood plains and floodways located within a Reserve, where necessary					

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant			Engr	
	I/R	NA	Explanation / Location in Plan	I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)					
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)					
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.					
D. Kansas Department of Transportation					
E. Sedgwick County Right-of-way Permit					

Tab 1. Project Narrative

A. Location

The subject property is in the City of Wichita, Sedgwick County, Kansas and has an approximate area of 58.4 acres. The development is located in the SE ¼ of Section 33, Township 26 South, Range 2 East. The site is shown on the USGS Map, Figure 1.1.

B. Discussion of Development

The area of the plat is currently undeveloped. The proposed plan is to add 12 softball fields, 4 tee-ball fields and 2 baseball fields along with parking and supporting buildings for the site. The area south of the site has currently been developed into a soccer complex including parking and concession areas. Detention ponds are also proposed to collect the site runoff to insure the proposed runoff conditions does not exceed the existing runoff conditions.

C. Discussion of Offsite

Runoff flows into the Northeast Baseball Complex from the nearby airport west. There is a natural ridge along the south property line so that the runoff from the existing soccer complex does not enter the proposed site.

D. Summary of Runoff

The project was modeled using the SCS method in Hydraflow Hydrographs and the results have been summarized in Table 1 comparing the total runoff leaving the site in the existing conditions and the proposed conditions.

Table 1. Existing/Proposed Conditions Comparison

Site Conditions	Design Storm Flows (cfs)				
	2-yr	5-yr	10-yr	25-yr	100-yr
Existing	41.8	67.3	84.8	111.9	151.4
Proposed	40.3	63.1	82.1	108.9	151.3

E. Best Management Practices

The site will be seeded or sodded after construction of grading and utilities are complete. The outlet structure of the detention pond will be protected against erosion.

F. Plat

The plat is included, Figure 1.2.

G. Preliminary Grading Plan

Each field has been preliminarily graded and can be seen in Figure 1.3.

H. Professional Engineer Seal

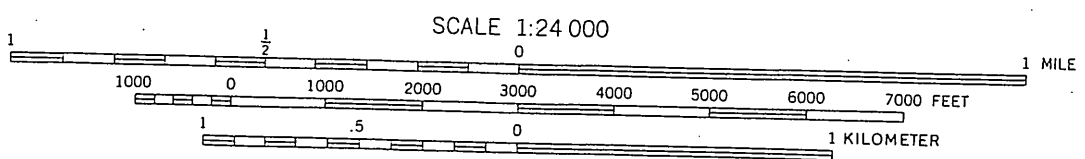
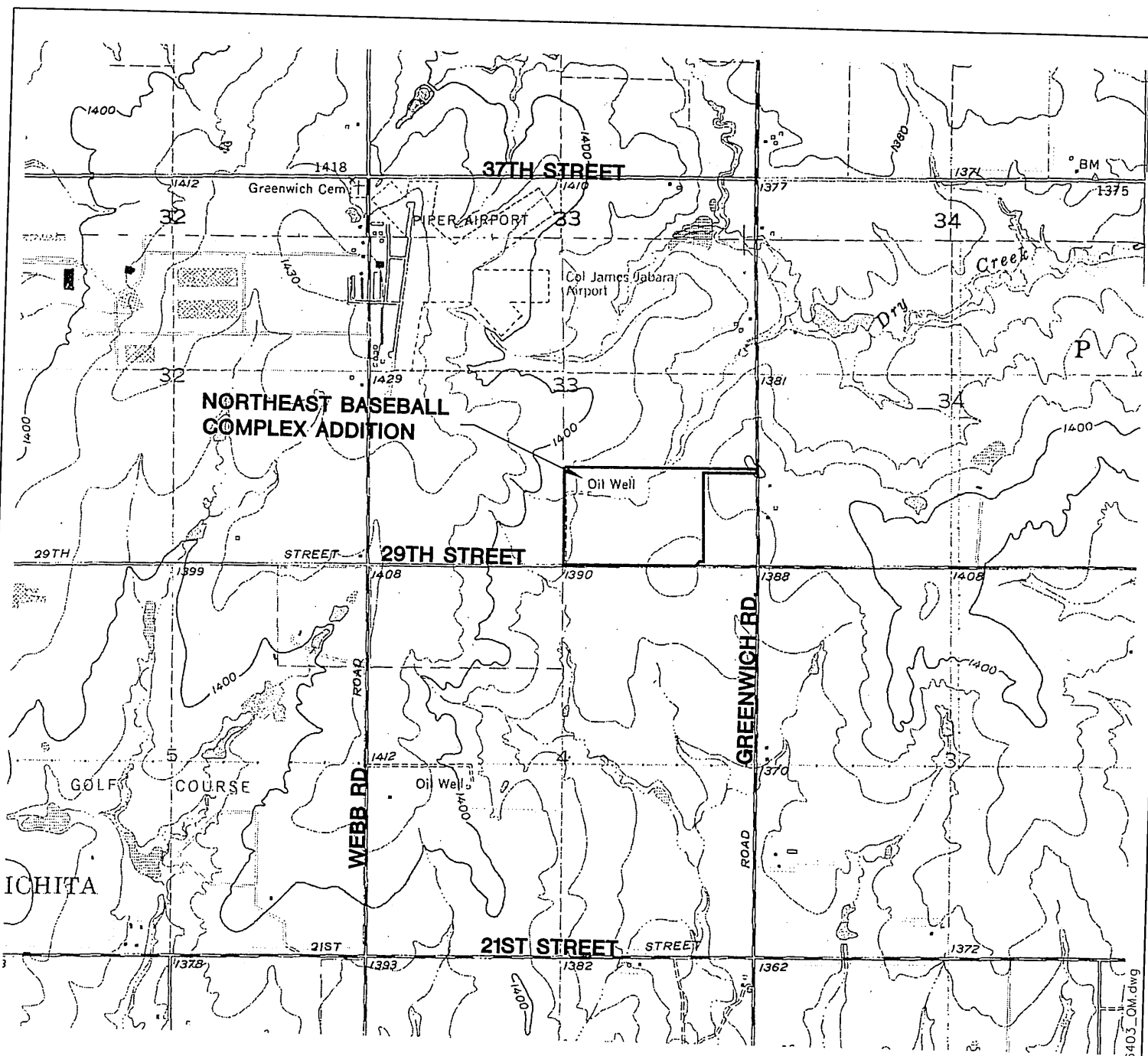
The cover of the report will be signed and dated.

I. CD

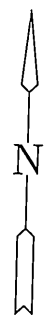
A CD of the drainage report in PDF format is attached to the inside front cover of the bound report. The checklist is included in Tab 0.

Figure 1.1

USGS Quadrangle Map



CONTOUR INTERVAL 5 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



MKEC ENGINEERING CONSULTANTS, INC. 411 N. WEBB ROAD WICHITA, KS. 67206 316-684-9600	NORTHEAST BASEBALL COMPLEX PROJECT NAME	
	USGS GEOLOGICAL SURVEY WICHITA, KANSAS QUADRANGLE SHEET TITLE	
TMH DESIGN BY:	CMJ DRAWN BY:	KLA CHECKED BY:
MARCH 2007 DATE	06403 JOB NO.	1 / 1 SHEET/OF

J:\Civil\06403_NE Baseball\dwg\SWPPP\06403_CMI.dwg

Figure 1.2

Plat

FINAL PLAT

NORTHEAST BASEBALL COMPLEX ADDITION

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

NW. Cor., SE. 1/4, Sec. 33,
T26S, R2E, 6th P.M.

N89°03'54"E 2595.27'(M)
2655.27'

Found 1/2" Bar

W. LINE OF SE. QUARTER SECTION
N00°58'01"W 1325.45'(CM)

SW. Cor., SE. 1/4, Sec. 33,
T26S, R2E, 6th P.M.
Found 5/8" Rebar w/ MKEC
CLS 39 Id cap

S89°07'09"W 1787.07'(M)
S89°07'13"W(P) 1787.16'(P)

N89°07'13'(P) 2668.88'(P)
N89°07'09'(M) 2669.08'(M)

S. LINE OF SE. QUARTER SECTION
S40°35'07"W(M,P)
R0 007'(M) R0 007'(P)

S89°07'13"W(P)
S89°07'34"W(M)
56.31'(M)

Found 5/8" Rebar
w/ MKEC CLS 39 Cap

N. 29TH ST.

S01°33'47"E(M) 1207.36'(M)
S00°00'00"E(P) 1207.31'(P)

Found 5/8" Rebar
w/ MKEC CLS 39 Cap

S 89°03'59" W 712.00'(M)
S 89°22'26" W(P) 711.99'(P)

772.00'

S 01°33'44"
60.01'(M)

ROAD

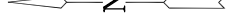
GREENWICH

CL

E. LINE OF SE. QUARTER SECTION

SE. Cor., Sec. 33, T26S,
R2E, 6th P.M.

NW. Cor., NW. 1/4, Sec.
17, T27S, R2E, 6th P.M.



1"=100' / 1 : 1200

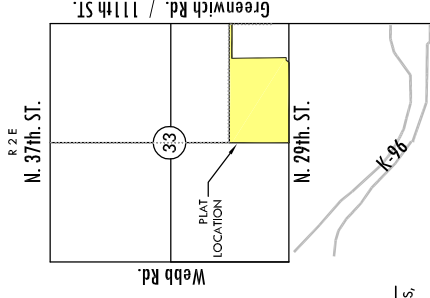


Basis of Bearings: Kansas coordinate system 1983 south
zone bearing of N01°33'44"W along the W. Line of SE. 1/4,
Sec. 33, T26S, R2E, 6th P.M.

LEGEND

Date of Survey: September, 2006

- △ = Section Corner Monument Found
- ⊙ = Found Survey Monument
- See annotation
- = Set 3/4" Rebar w/ MKEC
- = CLS 39 Id. cap
- (M) = Measured
- (P) = Plotted
- (D) = Deeded



VICINITY MAP

UTILITY EASEMENT - LINE TABLE		
LINE	LENGTH	BEARING
L1	110.66	S47°24'29"E
L2	401.76	S89°24'40"E
L3	789.32	S85°49'15"E
L4	402.04	S01°34'54"E
L5	109.49	S35°43'37"W
L6	58.39	S05°00'00"W
L7	168.64	N01°34'54"W
L8	101.24	N35°43'37"E

MKEC
ENGINEERING
CONSULTANTS, INC.

411 N. WEBB ROAD
WICHITA, KS. 67206
316-684-9600

Figure 1.3

Preliminary Grading Plan

**OVERALL GRADING PLAN
CENTRAL PLAINS YOUTH SPORTS
NORTHEAST BASEBALL COMPLEX**

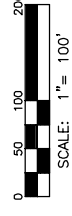
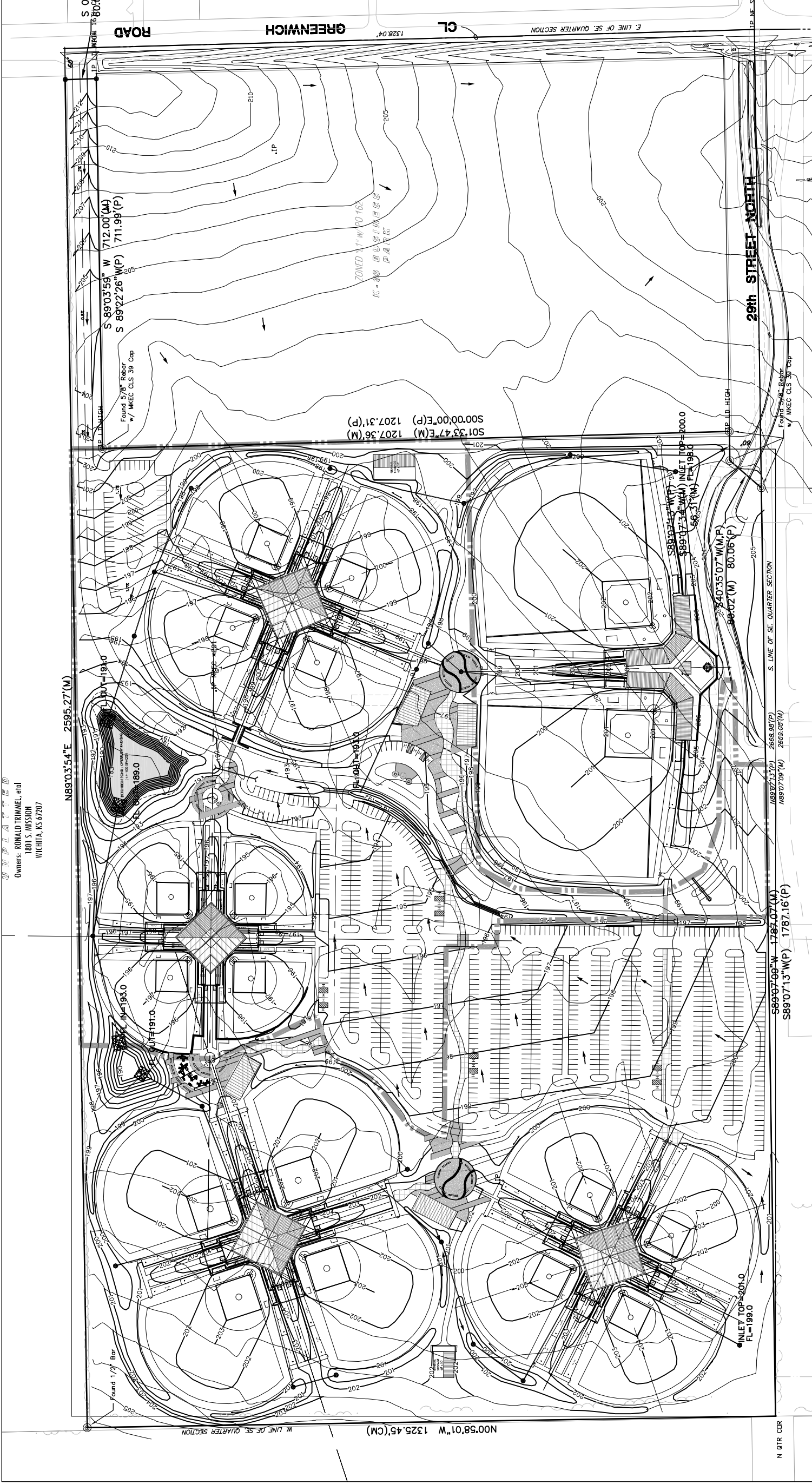
**GRADING
PLAN**

SHEET TITLE
DBG / DBG / JAG
Developed / Drawn / Checked

ISSUED
MARCH 23, 2007
REVISED

SHEET NO.
1 of XX

J:\C:\M\06403_NE_Baseball\dwg\06403g1



**PRELIMINARY PRINT
NOT FOR CONSTRUCTION**
DATE: MARCH 23, 2007

EARTHWORK SUMMARY

OVERALL GRADING PROJECT	58,130 C.Y.
*EXCAVATION	57,950 C.Y.
COMPACTED FILL (95% DENSITY)	
PHASE ONE GRADING	31,460 C.Y.
*EXCAVATION	15,275 C.Y.
COMPACTED FILL (95% DENSITY)	

*INCLUDES 15% ADJUSTMENT FOR COMPACTION AND HANDLING.

UNPLATTED
Owners: RONALD TRIMMEL, etd
1801 S. MISSION
WICHITA, KS 67207

N OTR CDR

Tab 2. Existing Conditions Runoff Calculations

A. Orthophotograph

The aerial photograph of the Northeast Baseball Complex site is shown in Figure 2.1.

B. Runoff Method

The site was modeled using the SCS method, see Table 2 runoff values.

C. Existing Topography

The existing topography is shown on the Existing Conditions Drawing, Figure 2.2.

D. Site Areas

The total site area of the Northeast Baseball Complex is 58.4 acres. The majority of the site is currently undeveloped; there is a total of 1% impervious surface where 29th Street North crosses through the site.

E. Benchmarks

Benchmarks used for site control are included on the Existing Basin Drawing, Figure 2.2. The main benchmark used was a step spike on the west side of the power pole located on the northeast side of the 29th Street and Greenwich Road intersection.

F. Streams, Creeks, and Waterways

The site lies within a branch of the Gypsum Creek. The existing FEMA boundaries are shown on the FIRM map, Figure 2.3. The majority of the site is located within flood Zone X, areas outside the 500-yr floodplain, while a small corridor through the site is located in Zone A of an unstudied floodplain, FIRM panel 20173CO 377E, effective date February 2, 2007, Sedgwick County, Kansas.

G. Soils

The soils present on site are primarily Goessel silty clay, 1 to 3 percent slopes, HSG "D" and Clime silty clay, 3 to 7 percent slope, HSG "C" covers a small portion of the northeast corner of the proposed site. An overall HSG of "D" was used for calculations. The site is shown on the Soil Survey, Figure 2.4.

H. Natural Features

Currently a soccer complex is located south of the site across 29th Street North and the remaining land surrounding the site is undeveloped. There are no major natural features located onsite.

I. Location of Existing Impervious Areas

Currently 29th Street North crosses through the Southeast corner of the site providing access to the existing parking lot for the soccer fields south of the proposed site.

J. Location of Existing Utilities

The site does not currently have any existing utilities or easements located across it.

K. Location of Existing Conveyance Systems

There is no existing storm sewer on the site. Currently the majority of runoff flows offsite to the north through an existing swale running through the middle of the site.

L. Flow Paths

The site was divided into 2 drainage basins. E1 encompasses the majority of the site, 67.8 acres, that flows into an existing drainage swale that flows offsite to the north. E2 includes only 1.2 acres of the site that flows offsite to the southeast. Flow paths are shown on the Existing Conditions Drawing, Figure 2.2.

M. Location and Sizes of Existing Structures

There are no existing structures onsite; runoff currently leaves the site via a naturally occurring drainage swale.

N. Existing Conditions Hydrologic Analysis

The hydraulic analysis was completed for the existing basins and the results have summarized below. The hydrographs are located in the Figure 2.6 tab.

Table 2. Existing Runoff.

Basin	Area (ac)	T _c (min)	Design Storm Flows (cfs)				
			2-yr	5-yr	10-yr	25-yr	100-yr
E1	67.8	88	40.5	65.3	82.3	108.6	146.9
E2	1.2	30	1.3	2.0	2.5	3.3	4.5

O. Pre-Developed Runoff Curve Numbers

The curve number used for pre-developed conditions was 78 to represent the undeveloped conditions with an HGS of "D".

P. Existing time of Concentration

The time of concentration was calculated using the FAA method. The calculations can be found in Figure 2.5.

Q. Downstream Drainage Capacity

Runoff from the site sheet flows towards the north property line. There is nothing immediately downstream of the flow path to evaluate for a maximum capacity.

R. Existing Structural Elevations

There are no existing structures onsite.

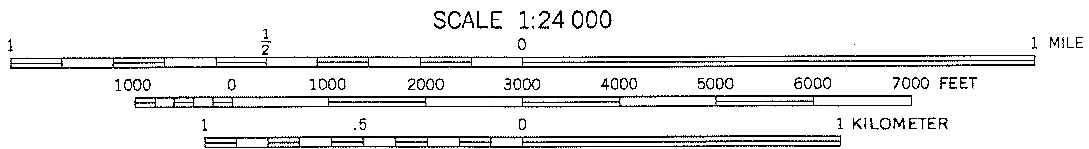
S. Open Channels

There are no open channels onsite.

T. Groundwater Elevations

Not applicable to this project.

Figure 2.1
Orthophotograph



CONTOUR INTERVAL 5 FEET
 NATIONAL GEODETIC VERTICAL DATUM OF 1929



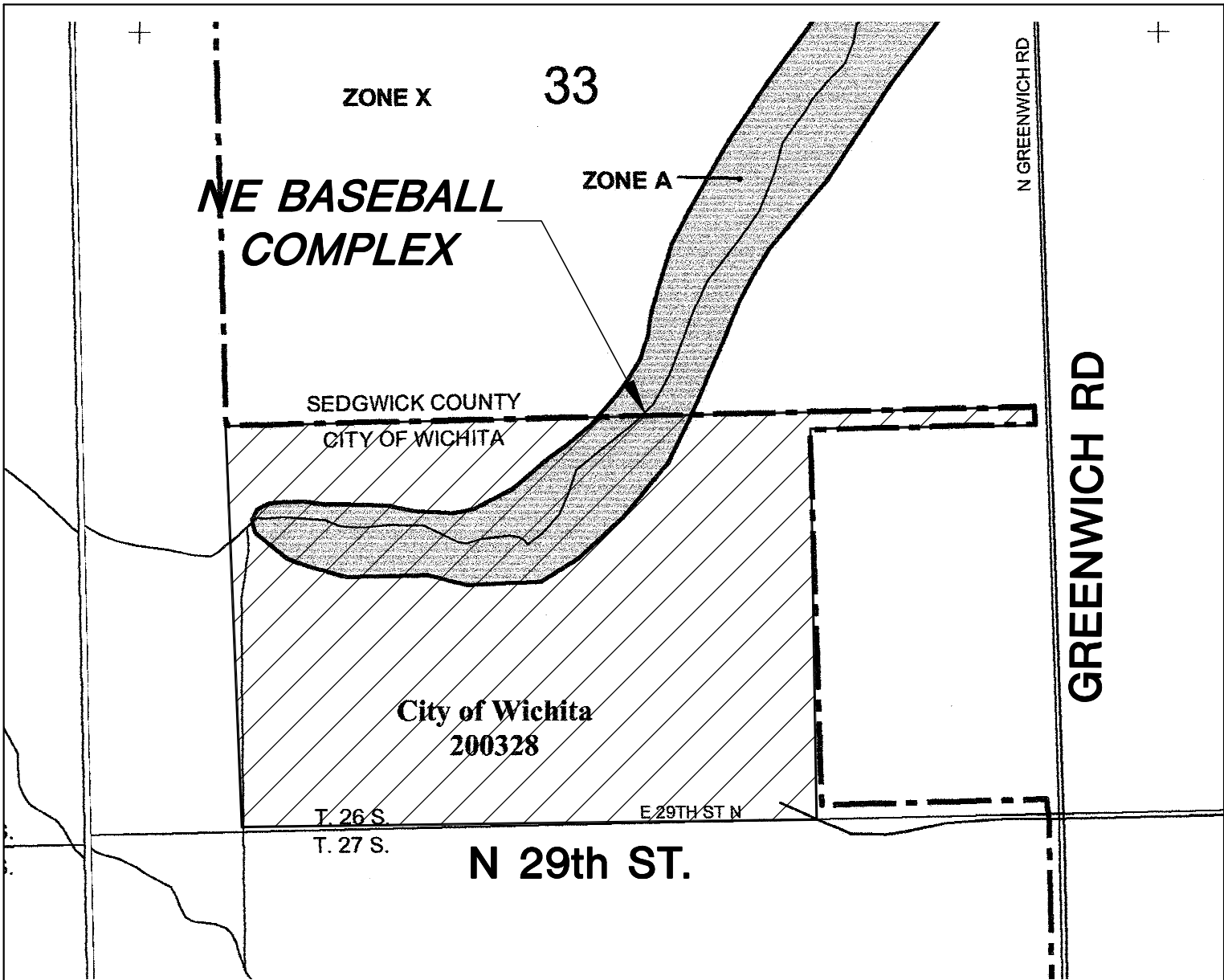
MKEC ENGINEERING CONSULTANTS, INC. 411 N. WEBB ROAD WICHITA, KS. 67206 316 - 684 - 9600	NORTHEAST BASEBALL COMPLEX PROJECT NAME		
	AERIAL MAP WICHITA, KANSAS QUADRANGLE SHEET TITLE		
	TMH DESIGN BY:	CMJ DRAWN BY:	KLA CHECKED BY:
	MARCH 2007 DATE	06403 JOB NO.	1 / 1 SHEET/OF

Figure 2.2

Existing Conditions Drawing

Figure 2.3

FIRM



NFP

PANEL 0377E

FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY, KANSAS AND INCORPORATED AREAS

PANEL 377 OF 700
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

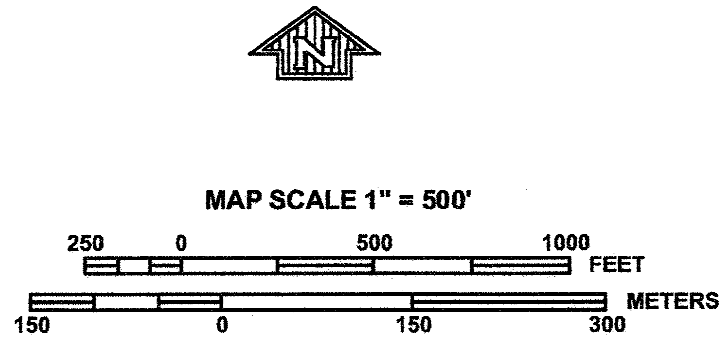
COMMUNITY	NUMBER	PANEL	SUFFIX
SEDGWICK COUNTY	200321	0377	E
WICHITA, CITY OF	200328	0377	E

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
20173C0377E

EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency



NE BASEBALL COMPLEX
PROJECT NAME

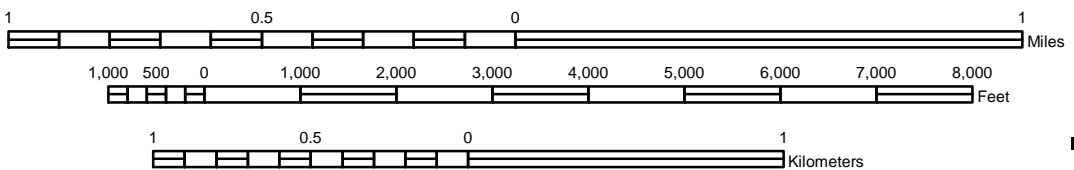
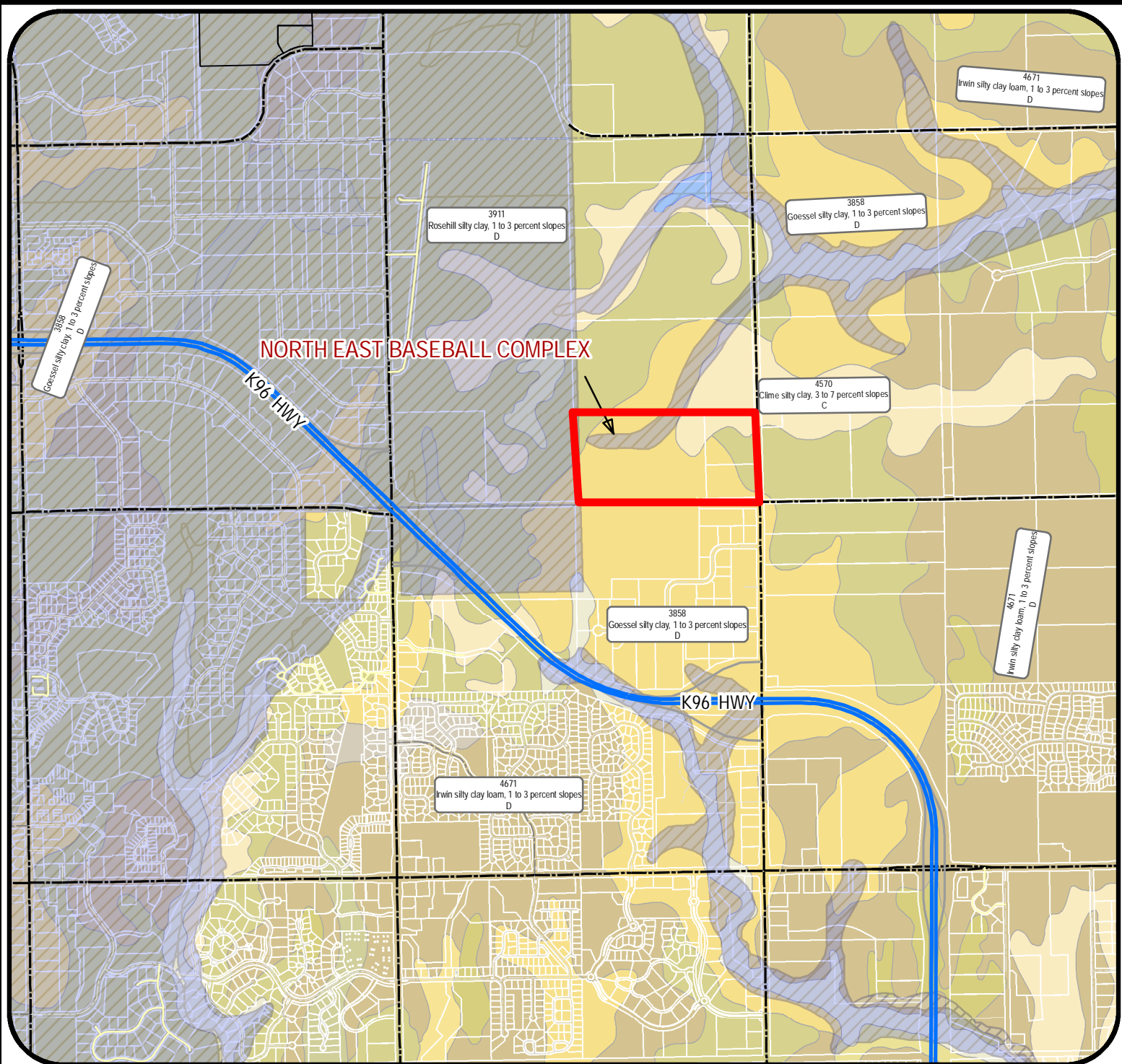
FIRM PANEL 377 OF 700
SEDGWICK COUNTY, KANSAS
SHEET TITLE

<i>CLS</i> DESIGN BY:	<i>SMB</i> DRAWN BY:	<i>GJA</i> CHECKED BY:
<i>MAY 2007</i> DATE	<i>06403</i> JOB NO.	<i>1 / 1</i> SHEET/OF

MKEC
ENGINEERING CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

J:\Civil\06403_NE_Baseball\dwg\SWPPP\06403FIRM

Figure 2.4
Soil Survey



J:\Civil\06403\dwg\DRNG\Inrcs-soll.mxd

NORTH EAST BASEBALL COMPLEX

Project Name: _____

Soil Survey - Sedgwick County, KS

Sheet Title: _____

	CMJ	April 2007
	Drawn By:	Date:
	TMHKLA	06403
	Design / Review:	Job No.:

Figure 2.5

T_c Calculations

5/7/2007

**Time of Concentration Calculations
Northeast Baseball Complex**

Soil Group D

Area Name Pre-Project	C	Maximum Elevation	Minimum Elevation	H	Flow Length (L)	T _c Calc	T _c
E1	0.30	202.0	193.0	9.0	2110	87.87	88
E2	0.30	207.0	205.0	2.0	320	30.13	30

Area Name Post-Project	C	Maximum Elevation	Minimum Elevation	H	Flow Length (L)	T _c Calc	T _c
P1	0.36	202.0	191.0	11.0	1400	54.01	54
P2	0.36	203.0	191.0	12.0	2020	71.21	71

Figure 2.6

Hydragraphs (Existing Conditions)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-----	-----	40.51	-----	65.30	82.34	108.60	128.95	146.91	E 1
2	SCS Runoff	-----	-----	1.26	-----	2.01	2.53	3.32	3.95	4.50	E 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	40.51	6	768	8.372	---	-----	-----	E 1
2	SCS Runoff	1.26	6	738	0.148	---	-----	-----	E 2

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

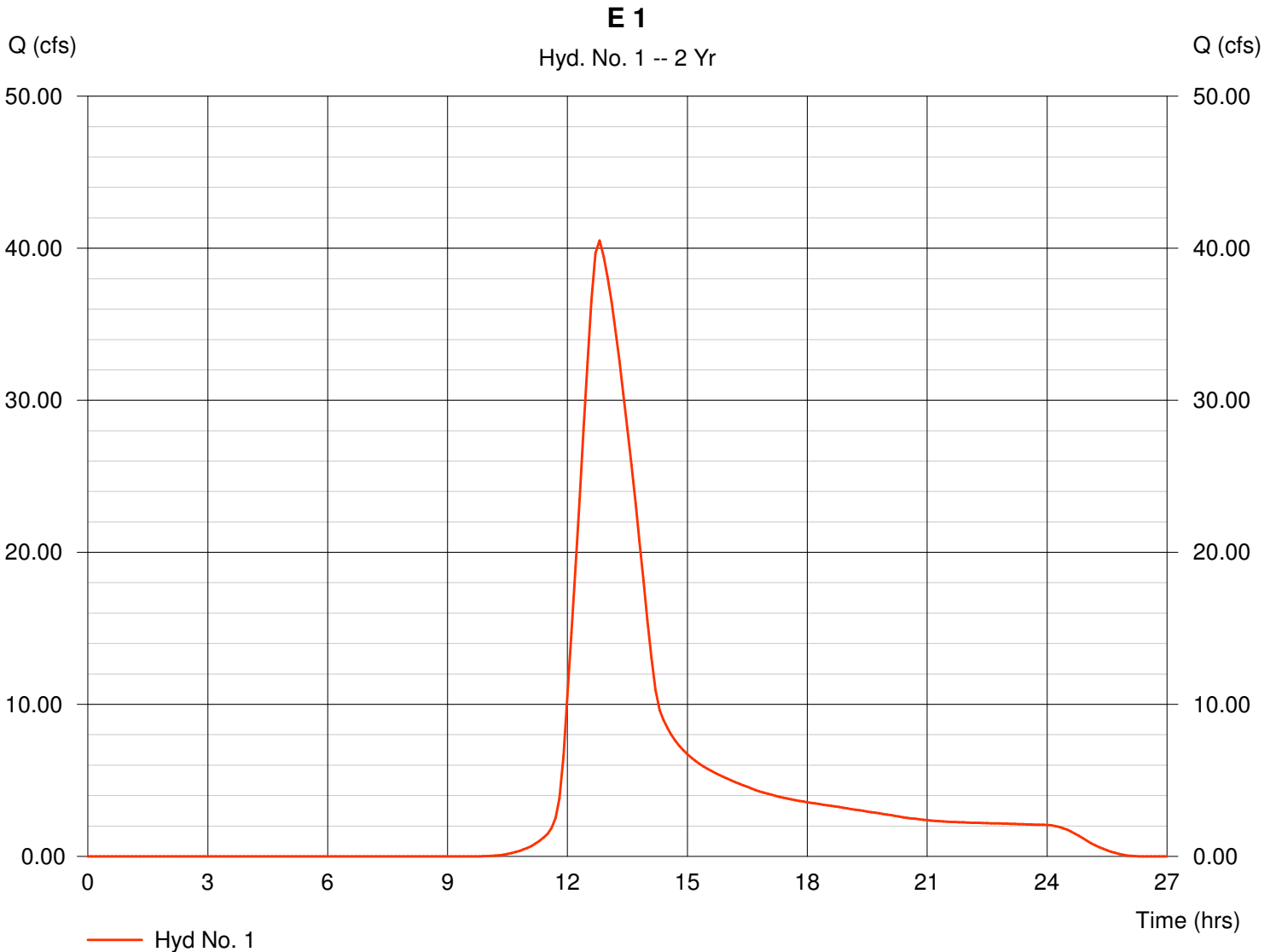
Hyd. No. 1

E 1

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 67.780 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.48 in
Storm duration = 24 hrs

Peak discharge = 40.51 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 88.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 8.372 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

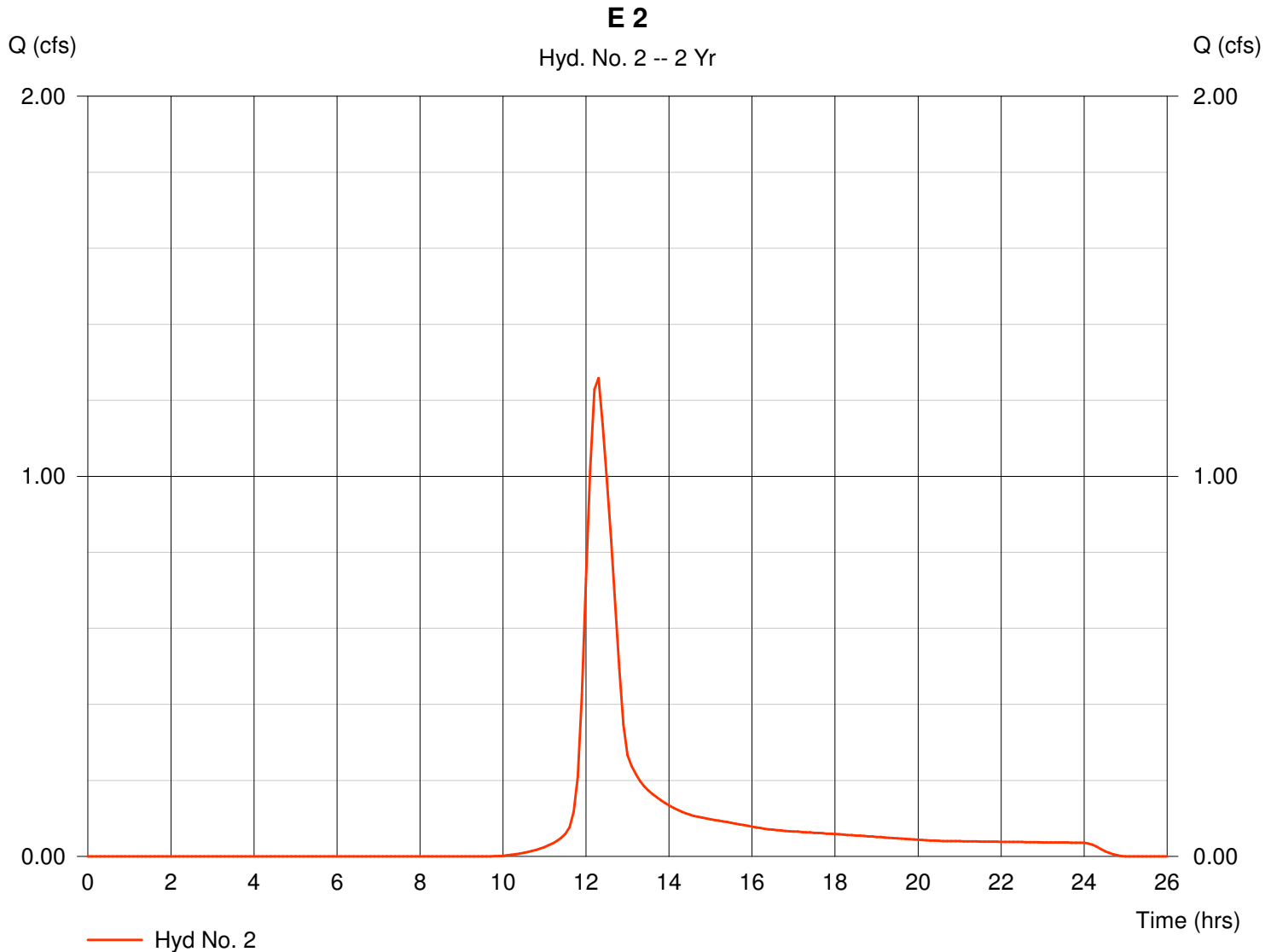
Hyd. No. 2

E 2

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 1.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.48 in
Storm duration = 24 hrs

Peak discharge = 1.26 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 0.148 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	65.30	6	768	13.184	---	-----	-----	E 1
2	SCS Runoff	2.01	6	738	0.233	---	-----	-----	E 2

06403_Existing Basins.gpw

Return Period: 5 Year

Monday, May 7 2007, 7:58 AM

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

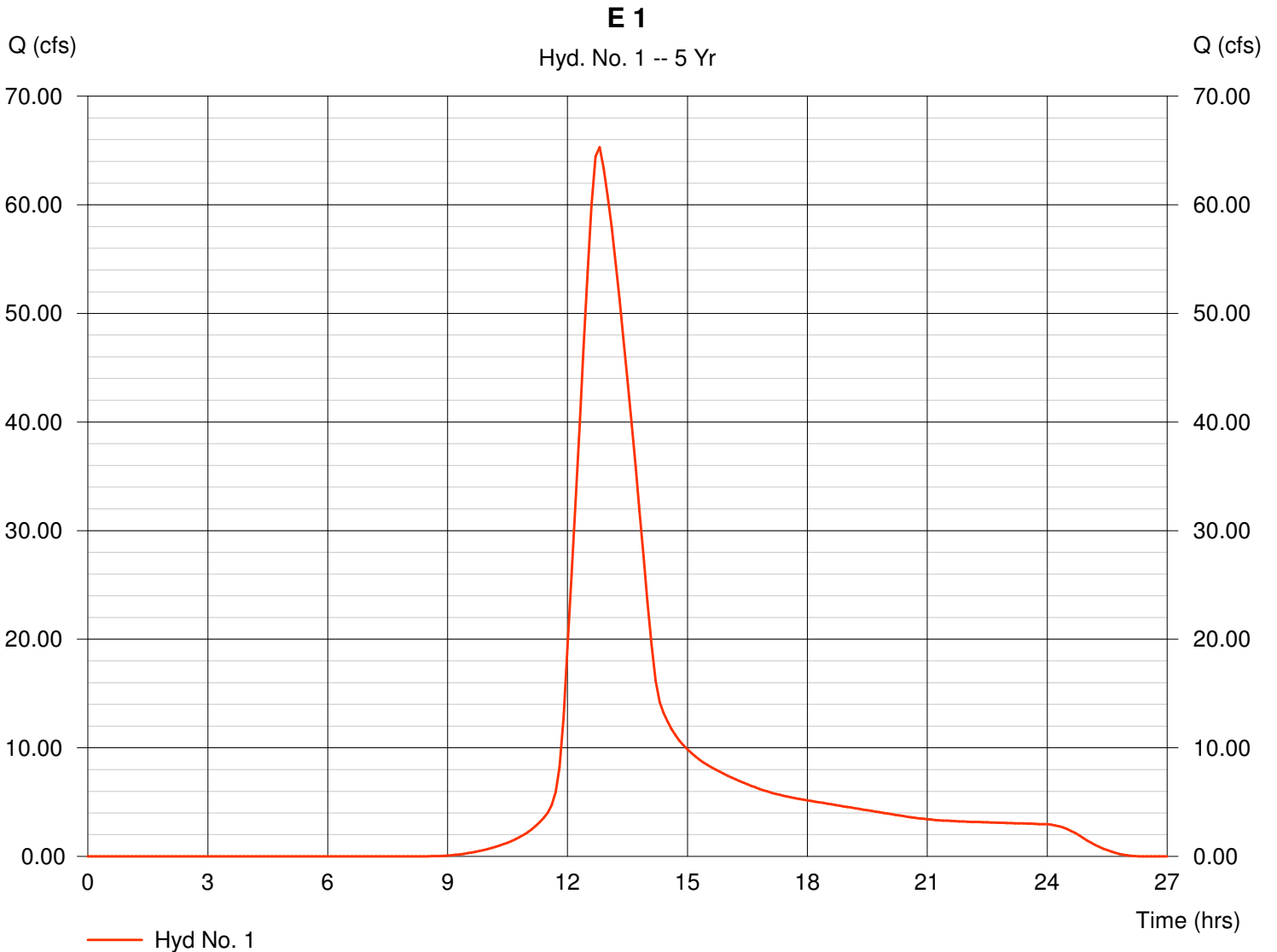
Hyd. No. 1

E 1

Hydrograph type = SCS Runoff
Storm frequency = 5 yrs
Drainage area = 67.780 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.55 in
Storm duration = 24 hrs

Peak discharge = 65.30 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 88.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 13.184 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

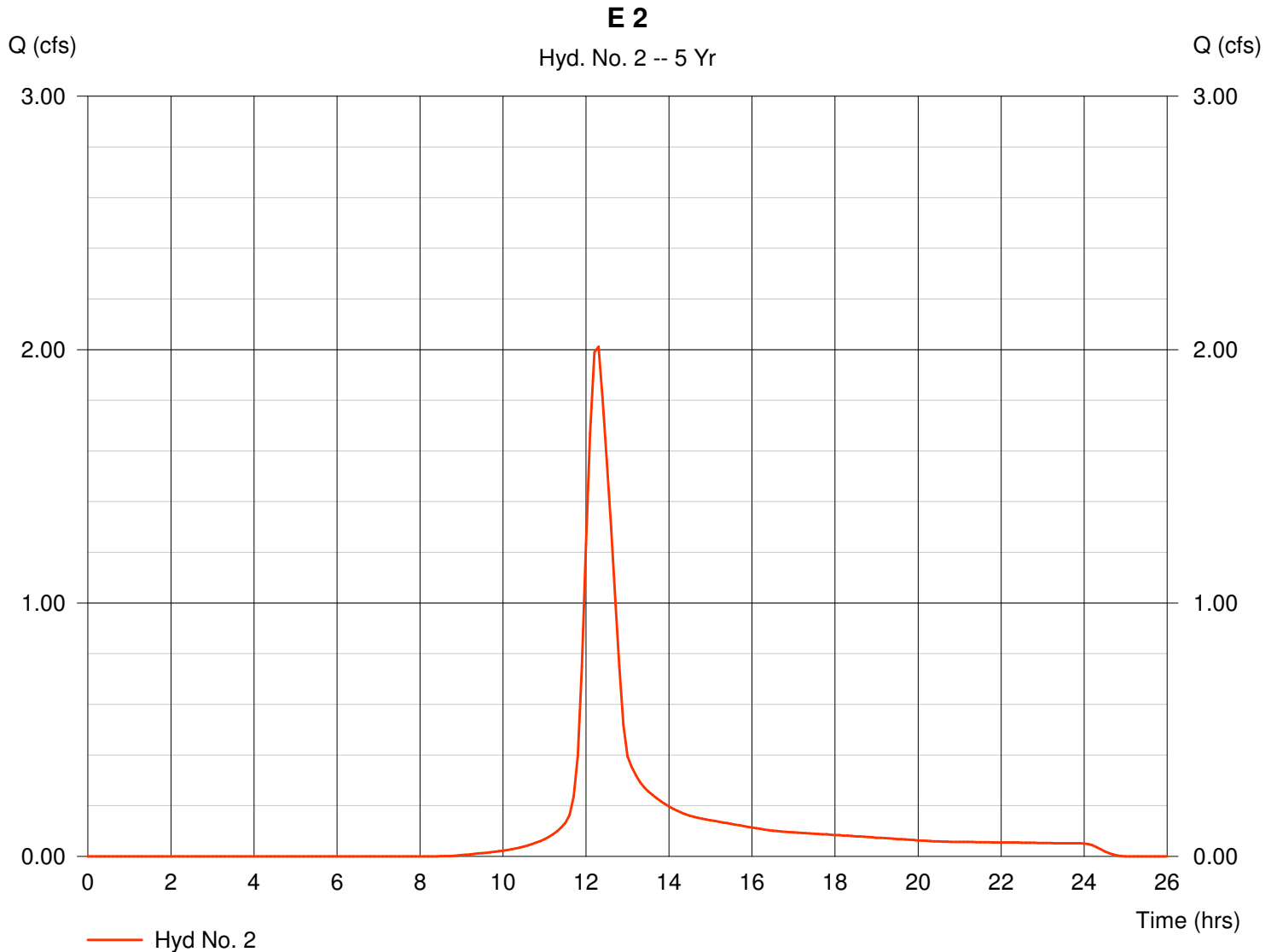
Hyd. No. 2

E 2

Hydrograph type = SCS Runoff
Storm frequency = 5 yrs
Drainage area = 1.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.55 in
Storm duration = 24 hrs

Peak discharge = 2.01 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 0.233 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	82.34	6	768	16.522	---	-----	-----	E 1
2	SCS Runoff	2.53	6	738	0.292	---	-----	-----	E 2

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

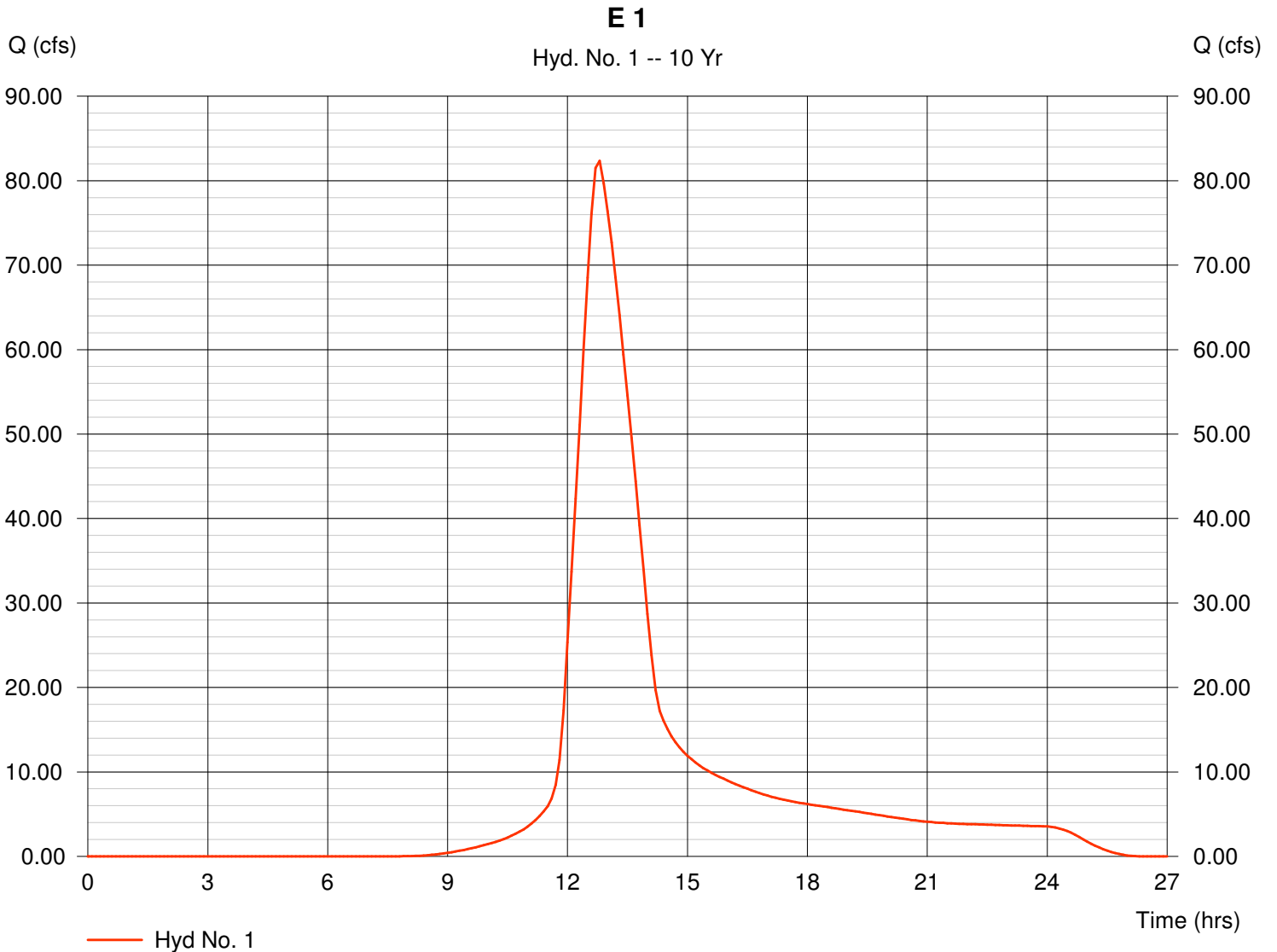
Hyd. No. 1

E 1

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 67.780 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.25 in
Storm duration = 24 hrs

Peak discharge = 82.34 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 88.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 16.522 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

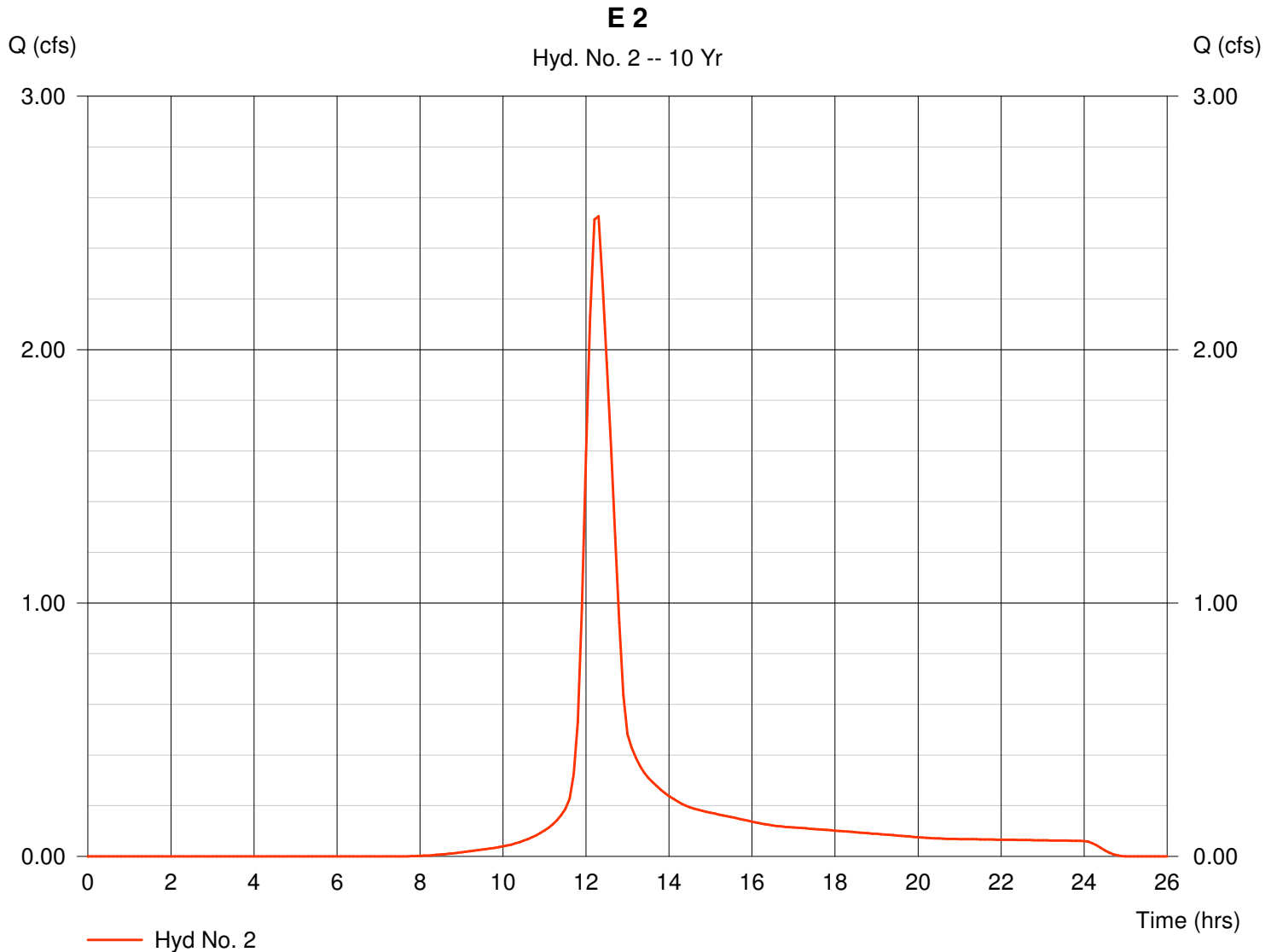
Hyd. No. 2

E 2

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 1.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.25 in
Storm duration = 24 hrs

Peak discharge = 2.53 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 0.292 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	108.60	6	768	21.719	---	-----	-----	E 1
2	SCS Runoff	3.32	6	732	0.383	---	-----	-----	E 2

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

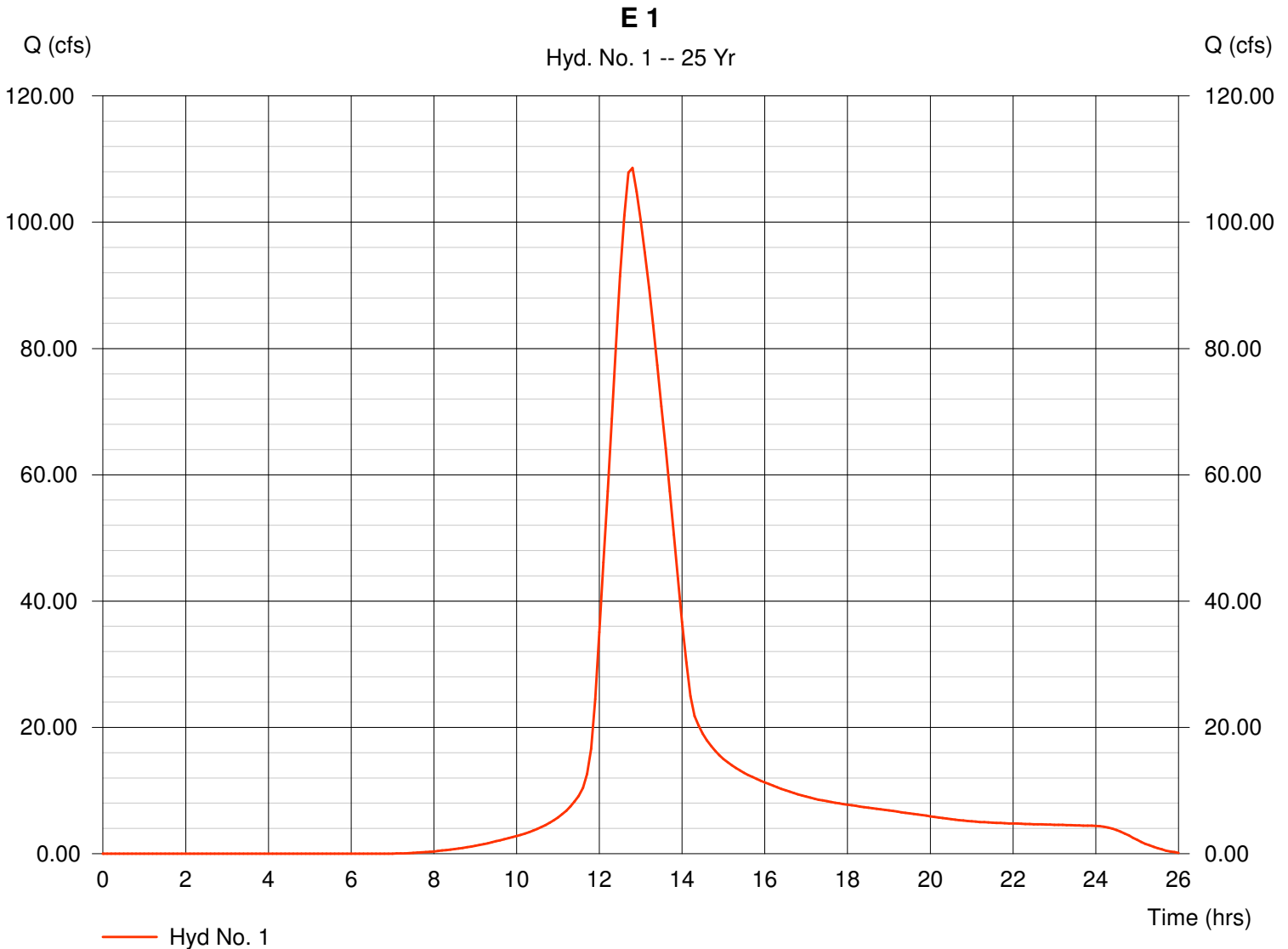
Hyd. No. 1

E 1

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 67.780 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 6.30 in
Storm duration = 24 hrs

Peak discharge = 108.60 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 88.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 21.719 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

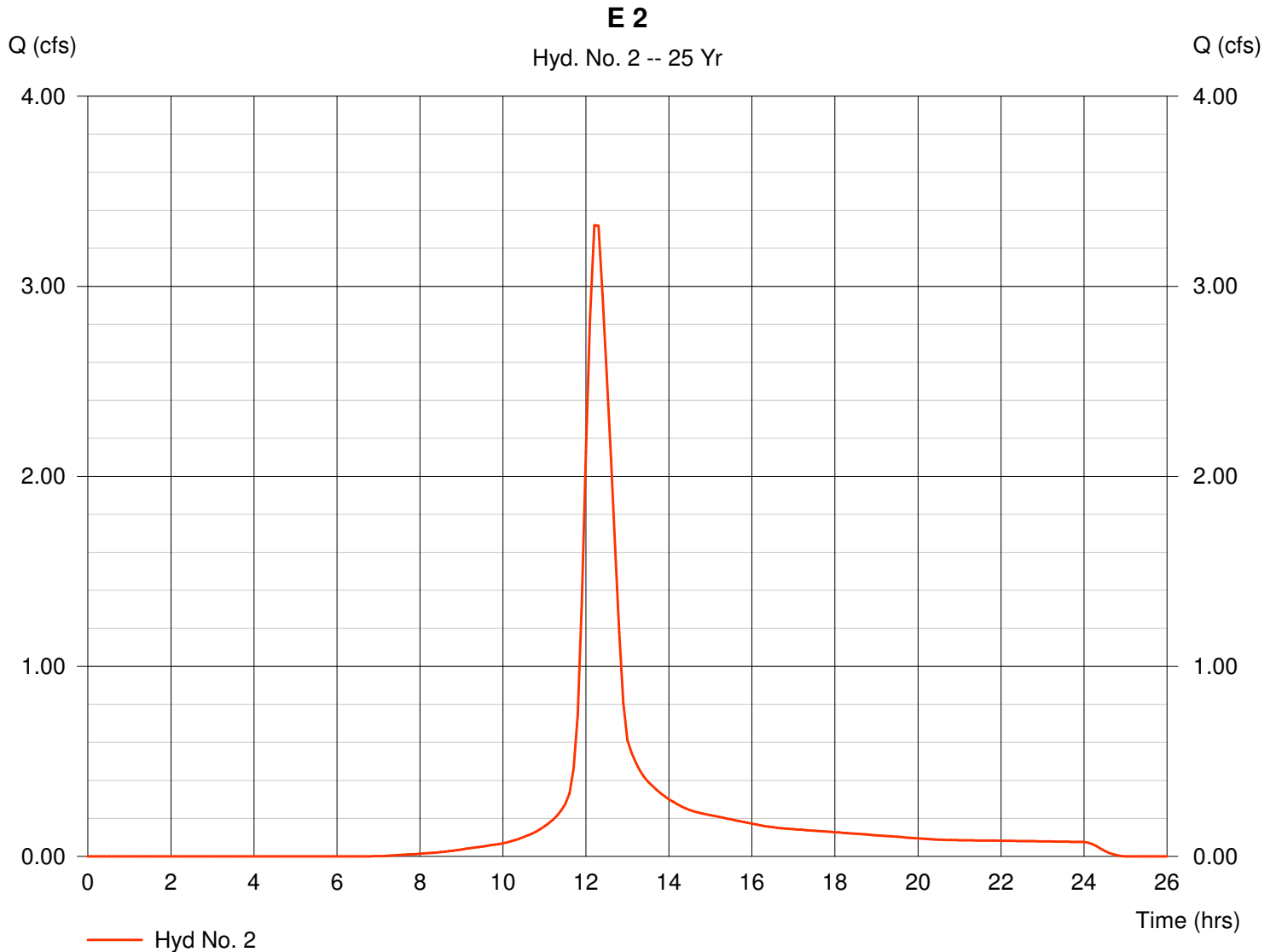
Hyd. No. 2

E 2

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 1.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 6.30 in
Storm duration = 24 hrs

Peak discharge = 3.32 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 0.383 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	146.91	6	768	29.408	---	-----	-----	E 1
2	SCS Runoff	4.50	6	732	0.519	---	-----	-----	E 2

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

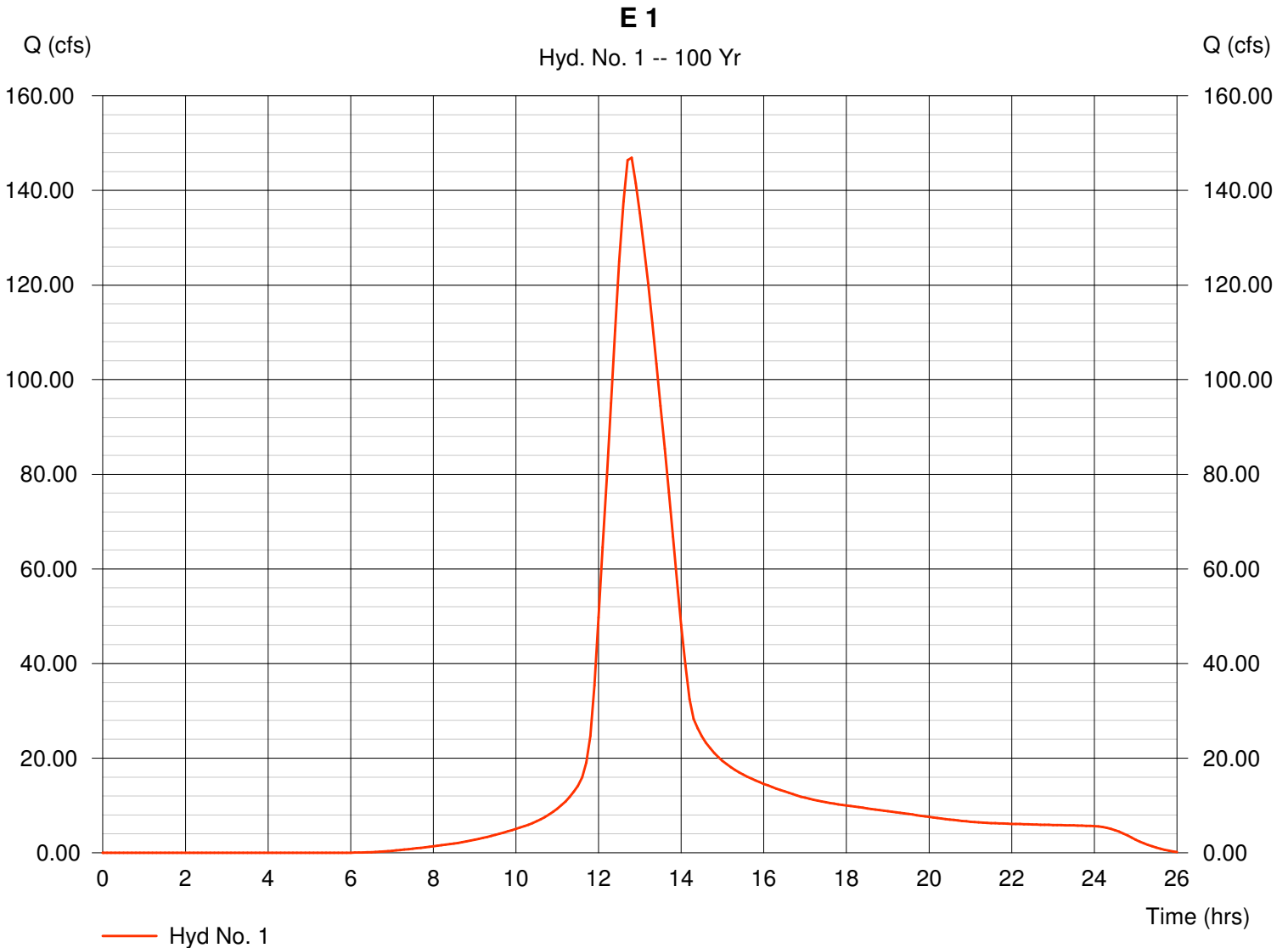
Hyd. No. 1

E 1

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 67.780 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.80 in
Storm duration = 24 hrs

Peak discharge = 146.91 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 88.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 29.408 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 7:58 AM

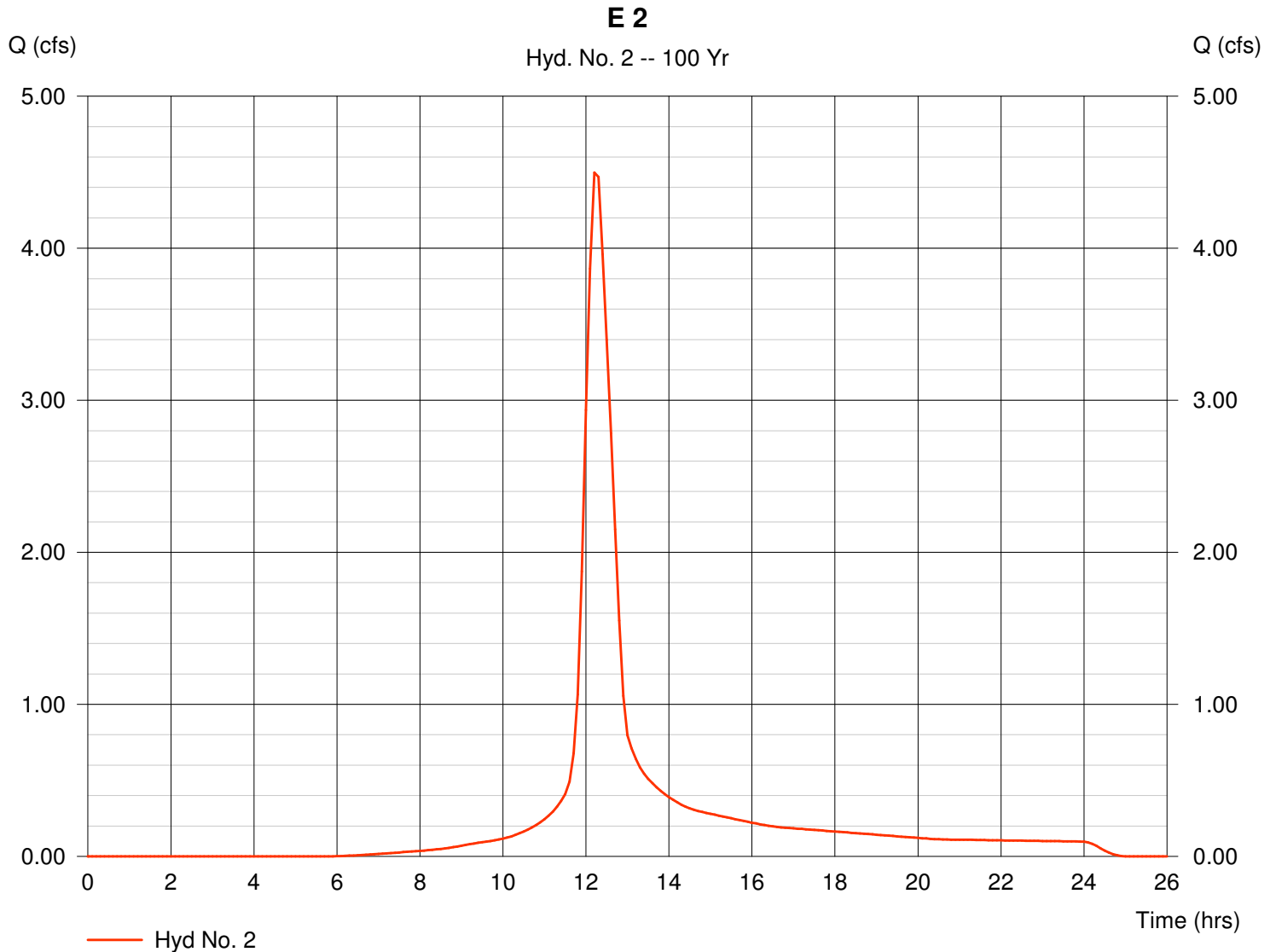
Hyd. No. 2

E 2

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 1.160 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.80 in
Storm duration = 24 hrs

Peak discharge = 4.50 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 0.519 acft



Tab 3. Post-Development Hydrologic Analysis

A. Proposed Conditions Hydrologic and Hydraulic Analysis

The hydraulic analysis was completed for the proposed basins and the proposed ponds, the results have summarized below. The hydrographs are located in the Figure 2.6 tab.

Table 3. Proposed Runoff.

Basin	Area ac.	T _c min.	Design Storm Flows (cfs)					100-yr Pond Elev.	100-yr Storage (ac-ft)
			2 year	5 year	10 year	25 year	100 year		
P1	16.3	54	17.5	26.1	31.9	40.7	53.3	--	--
P2	52.6	71	41.7	63.8	78.6	101.2	134.1	--	--
West Pond	--	--	17.1	25.0	29.9	38.4	50.2	194.9	0.5
Runoff to East Pond	--	--	58.2	88.4	108.2	139.5	184.2	--	--
East Pond	--	--	40.3	63.1	82.1	108.9	151.3	194.5	6.3

B. Proposed Time of Concentration

The time of concentration was calculated using the FAA method for basins P1 and P2. The calculations can be found on a spreadsheet in Figure 2.5.

C. Assumed Post-Developed Curve Numbers

The curve number used for developed conditions was 84.

D. Proposed Contours for Detention

The proposed contours are shown on the drainage and utility plan, Figure 3.1. The two proposed ponds will be hydraulically connected with the 36" outlet structure from the West Pond

E. Preliminary SWS Sizing Calculations

The pipes have been sized using Hydraflow Storm Sewer by Intelisolve, Figure 3.3.

F. Stage-Storage-Discharge

The stage-storage-discharge rating curve and all hydrographs for the Northeast Baseball Complex can be found in Figure 3.2. The total discharge leaving the site was decreased from the existing conditions in each of the design storms.

G. Analysis of Upstream/Downstream Impact

The impacts upstream and downstream of the site will not be changed from the addition of the Northeast Baseball Complex, the detention ponds will serve to lower the overall discharge from the site in each of the design storms.

H. Existing and Proposed Structural Elevations

The proposed SWS will be finalized during final grading.

I. Pond Design Elevations

The West Pond will have a normal pool elevation of 191.0 and is hydraulically connected with the East Pond with a 36" outlet pipe. The East Pond has a normal pool elevation of 191.0. During the 100-yr event the West Pond will reach a maximum elevation of 194.9 and the East Pond will rise up to an elevation of 194.5.

J. Structure Details

The West Pond will have an outlet pipe with a diameter of 36" with a flow line at 191.0 that flows directly into the East Pond. The East Pond will be controlled by a rectangular weir structure with multiple openings at different elevations to control both the smaller and the larger storms. The smallest opening is at 191.0 and has a crest length of 4', the next opening is at an elevation of 193.25 with a crest length of 10' and the final opening is at 194.0 and has a crest length of 18'.

K. Limits of Clearing and Grading

The entire site will be cleared and graded.

L. Location of Impervious Areas

Currently 29th Street North enters the site on the southeast corner of the site. In the proposed conditions, a parking lot will be added in the middle of the site that will be connected to the existing 29th Street North. Sidewalk will also be constructed around the site to give pedestrian access to each field.

M. Location of Utilities

Proposed utilities are shown on the drainage and utility plan, Figure 3.1.

N. Location of Conveyance Systems

Proposed utilities are shown on the drainage and utility plan, Figure 3.1. Storm water sewer will carry runoff to each of the proposed ponds. Storm water lines will also carry runoff from each ball field with trench drains around the backstop area.

O. Location of Channel Modifications

Not applicable to this project.

P. Selection and Location of Stormwater Controls

The West Pond water surface elevation will be controlled by a 36" pipe that discharges into the East Pond. A weir structure is used to control the water surface elevation in the East Pond as the runoff discharges offsite to the north.

Q. Emergency Overflow

The pond will overflow to the north in emergency situations.

R. Freeboard

The proposed ponds will have berms along the north edge of the ponds approximately 0.5' above the 100-yr water surface elevation to allow an emergency escape route to safely convey the runoff offsite to the north.

S. 100-Year High Water Line

The 100-year water surface elevation in the West pond is 194.9 and the East Pond reaches an elevation of 194.5 in the 100-year event.

T. Lowest Openings

There are no structures proposed near the detention areas to have a need for a lowest opening elevation table.

V. Maintenance Responsibility

The maintenance of the detention facilities will be the responsibility of the City of Wichita.

W. Offsite-Drainage Easements

Not applicable to this project.

Figure 3.1

Drainage and Utility Plan



NW Cor. SE 1/4, Sec. 33,
T26S, R2E, 6th P.M.
Final P.K. 1081

NW Cor. NW 1/4, Sec. 33,
T26S, R2E, 6th P.M.
Final P.K. 1081

SE Cor. Sec. 33, T26S,
R2E, 6th P.M.
Found 1/2" Iron w/ MKEC
C.S. 3" Cap

NOTES

1. LOT TOTAL - 1
2. ANNEXATION: within Wichita City corporate limits
3. EXISTING/PROPOSED USES: Vacant Land/ Baseball Complex
4. PLAT AREA: 68.93 acres
5. PLAT AREA: 58.42 acres
6. SURVEY DATE: Jan., 2007 (by MKEC)
7. PUBLIC UTILITIES: Shall be extended to site by petition.
8. FLOOD: According to FEMA FEMA Community Unit Panel 20173CD 377E, the site is located within the 500 year floodplain and zone "X". Areas determined to be outside the 500 year floodplain.
9. DRAINAGE: A drainage report shall accompany this plat. The property lies within a branch of Gypsum Creek drainage basin.

LEGAL DESCRIPTION

A tract of land located in the SE 1/4 of Section 33, Township 26 South, Range 2 East, of the 6th Prime Meridian, Wichita, Sedgewick County, Kansas, said tract being described as follows:
Beginning at the SW corner of said section, thence along the West line of said section, N00°58'01"W, a distance of 1,325.45 feet, thence N89°03'54"E, a distance of 2595.37 feet to a point on the West right-of-way of Greenwich Road; thence along said right-of-way line, S01°32'44"E, a distance of 60.01 feet; thence S89°03'39"W, a distance of 71.00 feet; thence S01°35'47"E, a distance of 1207.36 feet; thence S89°07'34"W, a distance of 56.31 feet; thence S40°35'07"W, a distance of 80.06 feet to a point on the South line of said section; thence along the south line of said section, S89°07'09"W, a distance of 1787.07 to the Point of Beginning.

LEGEND

- CONIFEROUS TREE & DIAMETER
- DECIDUOUS TREE & DIAMETER
- SIGN
- POWER POLE AND CUT ANCHOR
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- WATER MAIN
- SEWER MAIN
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- SANITARY SEWER PIPE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC

BENCH MARKS

STEP SPIKE IN WEST SIDE P1, 1/4 POLE NORTH OF 29th ST. ON EAST SIDE ELEV. = 201.51

LEGAL DESCRIPTION

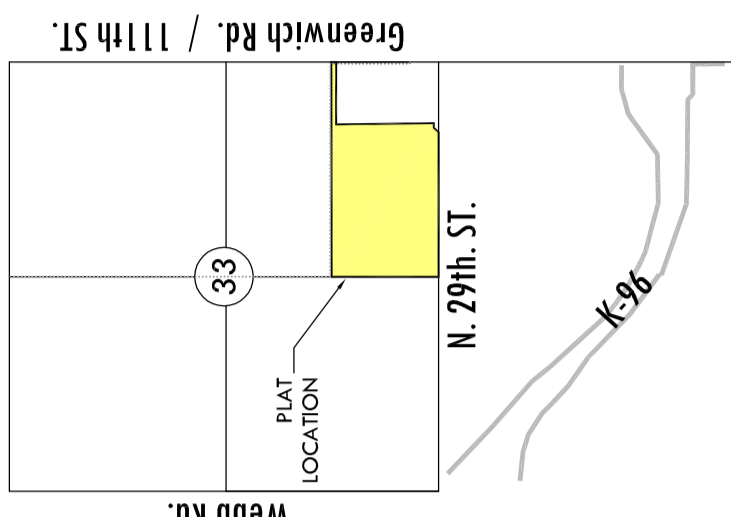
A tract of land located in the SE 1/4 of Section 33, Township 26 South, Range 2 East, of the 6th Prime Meridian, Wichita, Sedgewick County, Kansas, said tract being described as follows:
Beginning at the SW corner of said section, thence along the West line of said section, N00°58'01"W, a distance of 1,325.45 feet, thence N89°03'54"E, a distance of 2595.37 feet to a point on the West right-of-way of Greenwich Road; thence along said right-of-way line, S01°32'44"E, a distance of 60.01 feet; thence S89°03'39"W, a distance of 71.00 feet; thence S01°35'47"E, a distance of 1207.36 feet; thence S89°07'34"W, a distance of 56.31 feet; thence S40°35'07"W, a distance of 80.06 feet to a point on the South line of said section; thence along the south line of said section, S89°07'09"W, a distance of 1787.07 to the Point of Beginning.

LEGEND

- CONIFEROUS TREE & DIAMETER
- DECIDUOUS TREE & DIAMETER
- SIGN
- POWER POLE AND CUT ANCHOR
- LIGHT POLE
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- WATER MAIN
- SEWER MAIN
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- SANITARY SEWER PIPE
- TELEPHONE LINE
- UNDERGROUND ELECTRIC LINE
- OVERHEAD ELECTRIC

BENCH MARKS

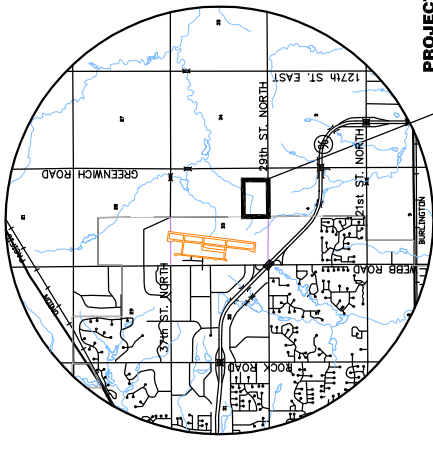
STEP SPIKE IN WEST SIDE P1, 1/4 POLE NORTH OF 29th ST. ON EAST SIDE ELEV. = 201.51



VICINITY MAP

PROPOSED BASINS
A portion of the SE 1/4, Sec. 33, T26S, R2E, 6th P.M.
NORTHEAST BASEBALL COMPLEX ADDITION

OWNERS / DEVELOPER: City of Wichita, 455 N. Main Attn: John Philbrick (316)-462-4637



PROJECT LOCATION

VICINITY MAP

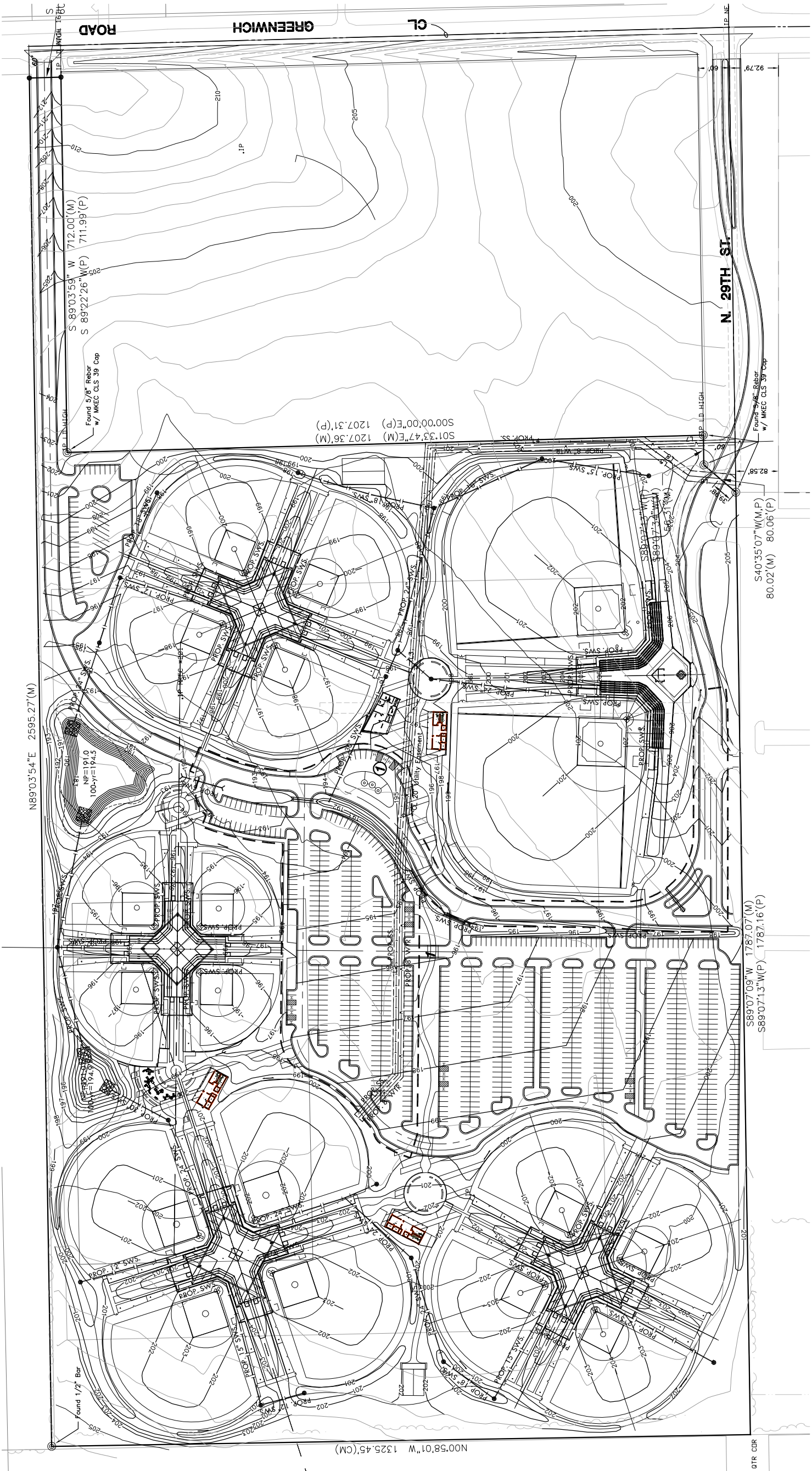
NO SCALE

BENCH MARK

Top Steel "T" post ea. 2" below grade 6' N. of fence corner, fence E. and S. gate V, at S. end McCandless. Elev. = 1314.06

LEGEND

- CTM - CONIFEROUS TREE & DIAMETER
- DTM - DECIDUOUS TREE & DIAMETER
- SN - SIGN
- B - BUSH
- ET - EDGE OF TREES
- F - FENCE
- SSMH - SANITARY SEWER MANHOLE
- GM - GAS METER
- PO - POLE
- HLP - HIGH LINE POLE
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- WP - WATER POLE AND ANCHOR
- TR - TELEPHONE RISER
- IN - INLET
- SS - STORM SEWER PIPE
- WP - WATER LINE
- SS - SANITARY SEWER LINE
- GL - GAS LINE
- TEL - TELEPHONE LINE
- UE - UNDERGROUND ELECTRIC LINE
- OE - OVERHEAD ELECTRIC
- SC - SECTION CORNER
- FA - FLOW ARROW



MKEC
ENGINEERING
CONSULTANTS
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

NE BASEBALL COMPLEX ADDITION
PROJECT NAME
DRAINAGE & UTILITY PLAN
SHEET TITLE
CLS
DESIGN BY: SMB
DRAWN BY: CJA
MAY 2007
DATE
06403
JOB NO.
1 / 1
SHEET/OF

L:\C\06403\NE Baseball\Drawings\SWP\06403DR.dwg 05/01/2007 11:57:26 AM CST

Figure 3.2

Hydragraphs (Proposed Conditions)

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-----	-----	17.50	-----	26.11	31.88	40.68	-----	53.30	P1
2	SCS Runoff	-----	-----	41.67	-----	63.76	78.63	101.24	-----	134.05	P2
4	Reservoir	1	-----	17.07	-----	24.99	29.88	38.39	-----	50.15	Dry Pond Discharge
5	Combine	2, 4	-----	58.15	-----	88.35	108.22	139.54	-----	184.20	Total Flow to Wet Pond
6	Reservoir	5	-----	40.28	-----	63.12	82.14	108.93	-----	151.31	Total Site Discharge

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	17.50	6	750	2.614	---	-----	-----	P1
2	SCS Runoff	41.67	6	762	7.619	---	-----	-----	P2
4	Reservoir	17.07	6	750	2.613	1	192.63	0.150	Dry Pond Discharge
5	Combine	58.15	6	756	10.232	2, 4	-----	-----	Total Flow to Wet Pond
6	Reservoir	40.28	6	792	10.232	5	193.09	2.329	Total Site Discharge

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

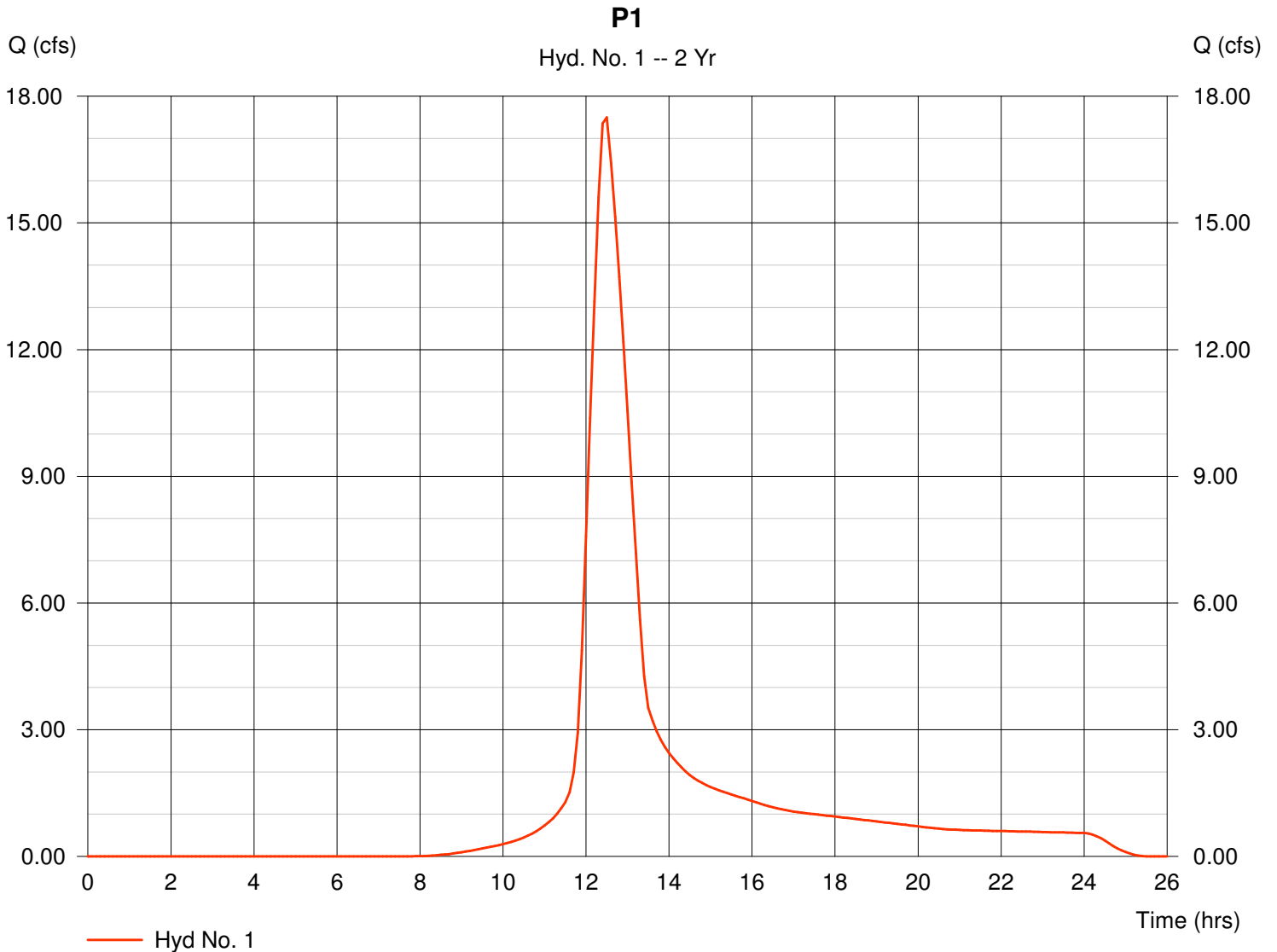
Hyd. No. 1

P1

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 16.340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.48 in
Storm duration = 24 hrs

Peak discharge = 17.50 cfs
Time interval = 6 min
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 54.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 2.614 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

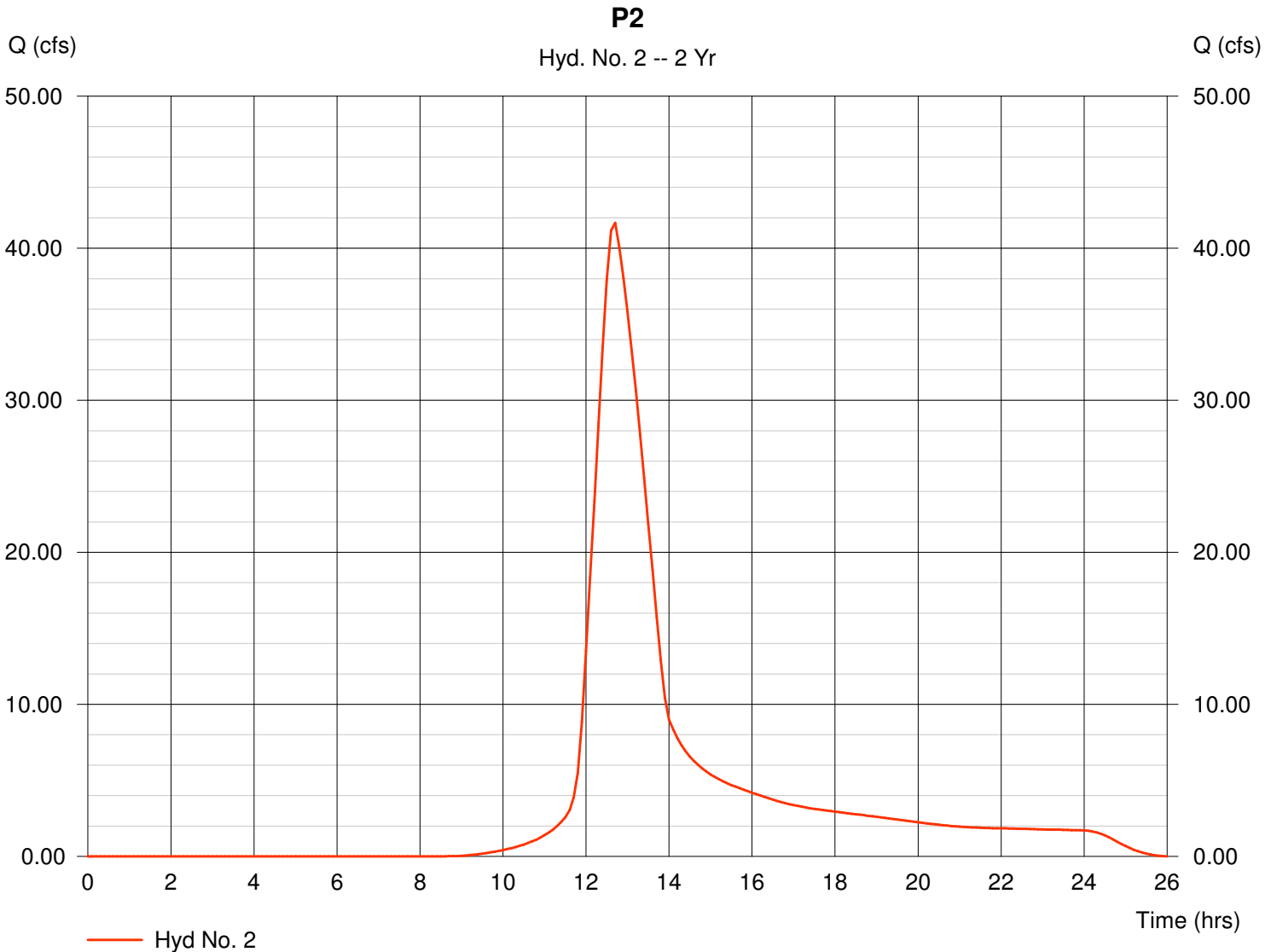
Hyd. No. 2

P2

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 52.590 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.48 in
Storm duration = 24 hrs

Peak discharge = 41.67 cfs
Time interval = 6 min
Curve number = 82
Hydraulic length = 0 ft
Time of conc. (Tc) = 71.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 7.619 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 4

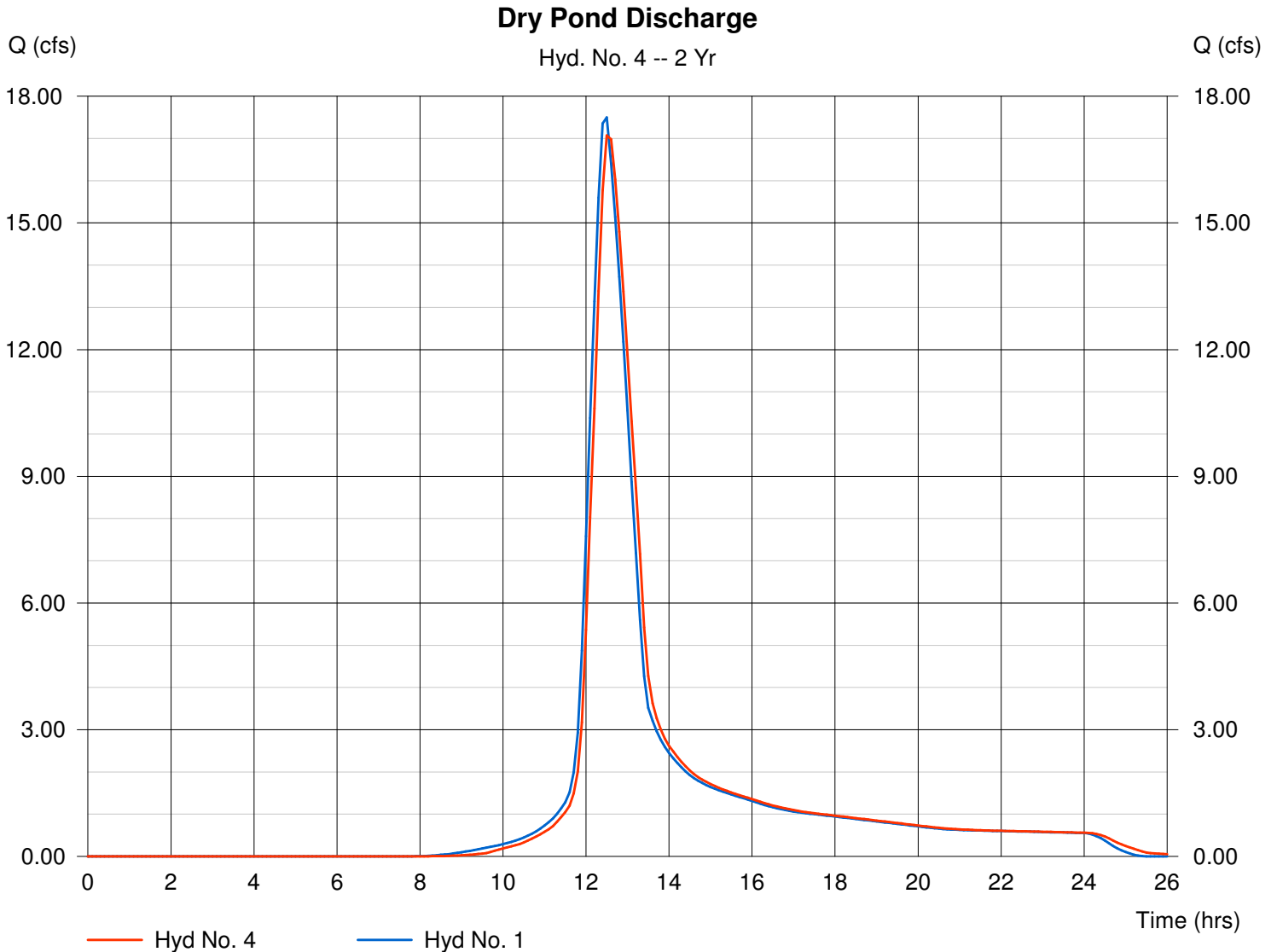
Dry Pond Discharge

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Inflow hyd. No. = 1
Reservoir name = West Pond

Peak discharge = 17.07 cfs
Time interval = 6 min
Max. Elevation = 192.63 ft
Max. Storage = 0.150 acft

Storage Indication method used.

Hydrograph Volume = 2.613 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

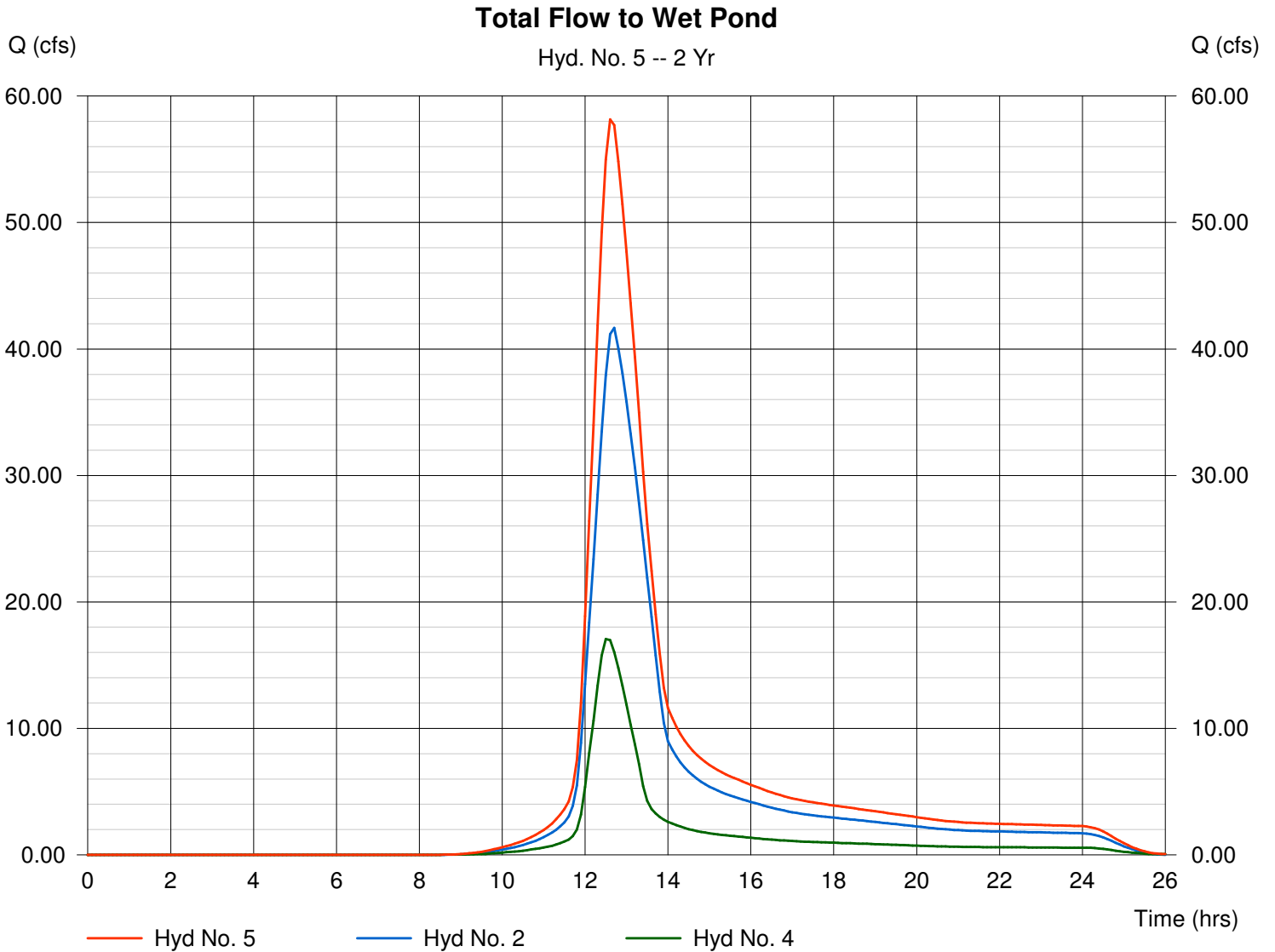
Hyd. No. 5

Total Flow to Wet Pond

Hydrograph type = Combine
Storm frequency = 2 yrs
Inflow hyds. = 2, 4

Peak discharge = 58.15 cfs
Time interval = 6 min

Hydrograph Volume = 10.232 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 6

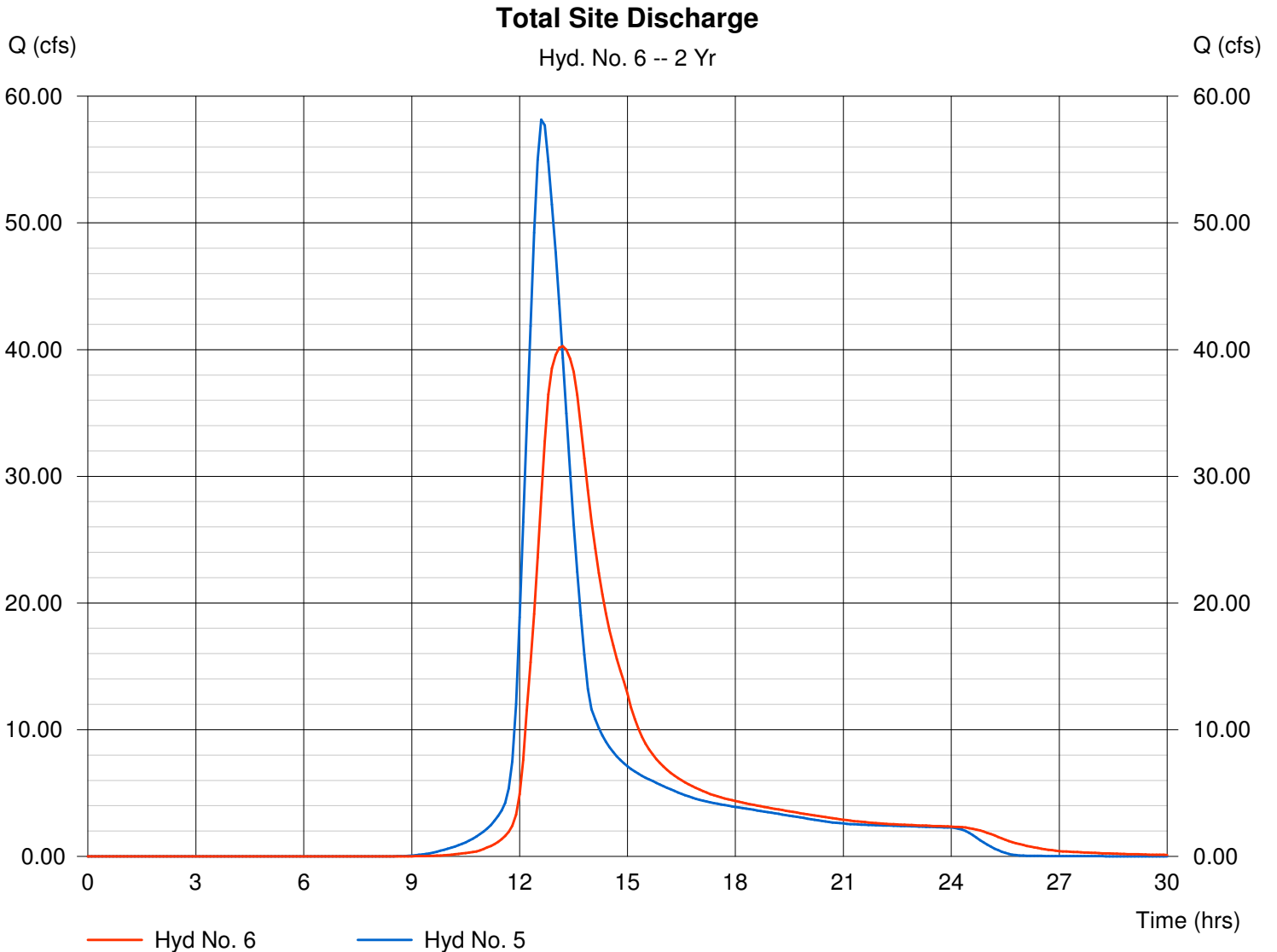
Total Site Discharge

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Inflow hyd. No. = 5
Reservoir name = East Pond

Peak discharge = 40.28 cfs
Time interval = 6 min
Max. Elevation = 193.09 ft
Max. Storage = 2.329 acft

Storage Indication method used.

Hydrograph Volume = 10.232 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	26.11	6	750	3.897	---	-----	-----	P1
2	SCS Runoff	63.76	6	762	11.561	---	-----	-----	P2
4	Reservoir	24.99	6	756	3.896	1	193.16	0.218	Dry Pond Discharge
5	Combine	88.35	6	756	15.458	2, 4	-----	-----	Total Flow to Wet Pond
6	Reservoir	63.12	6	786	15.458	5	193.61	3.551	Total Site Discharge

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

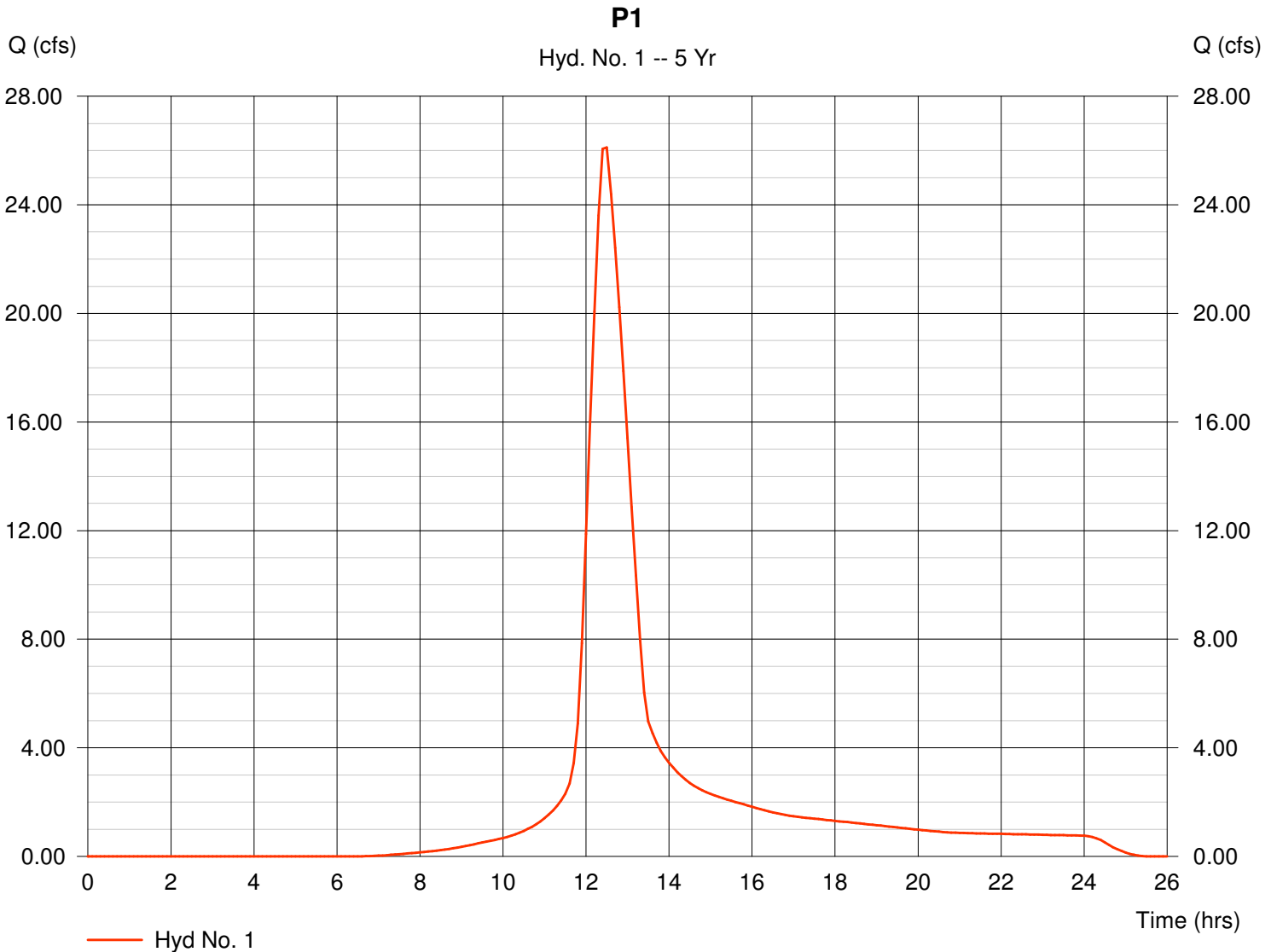
Hyd. No. 1

P1

Hydrograph type = SCS Runoff
Storm frequency = 5 yrs
Drainage area = 16.340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.55 in
Storm duration = 24 hrs

Peak discharge = 26.11 cfs
Time interval = 6 min
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 54.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 3.897 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

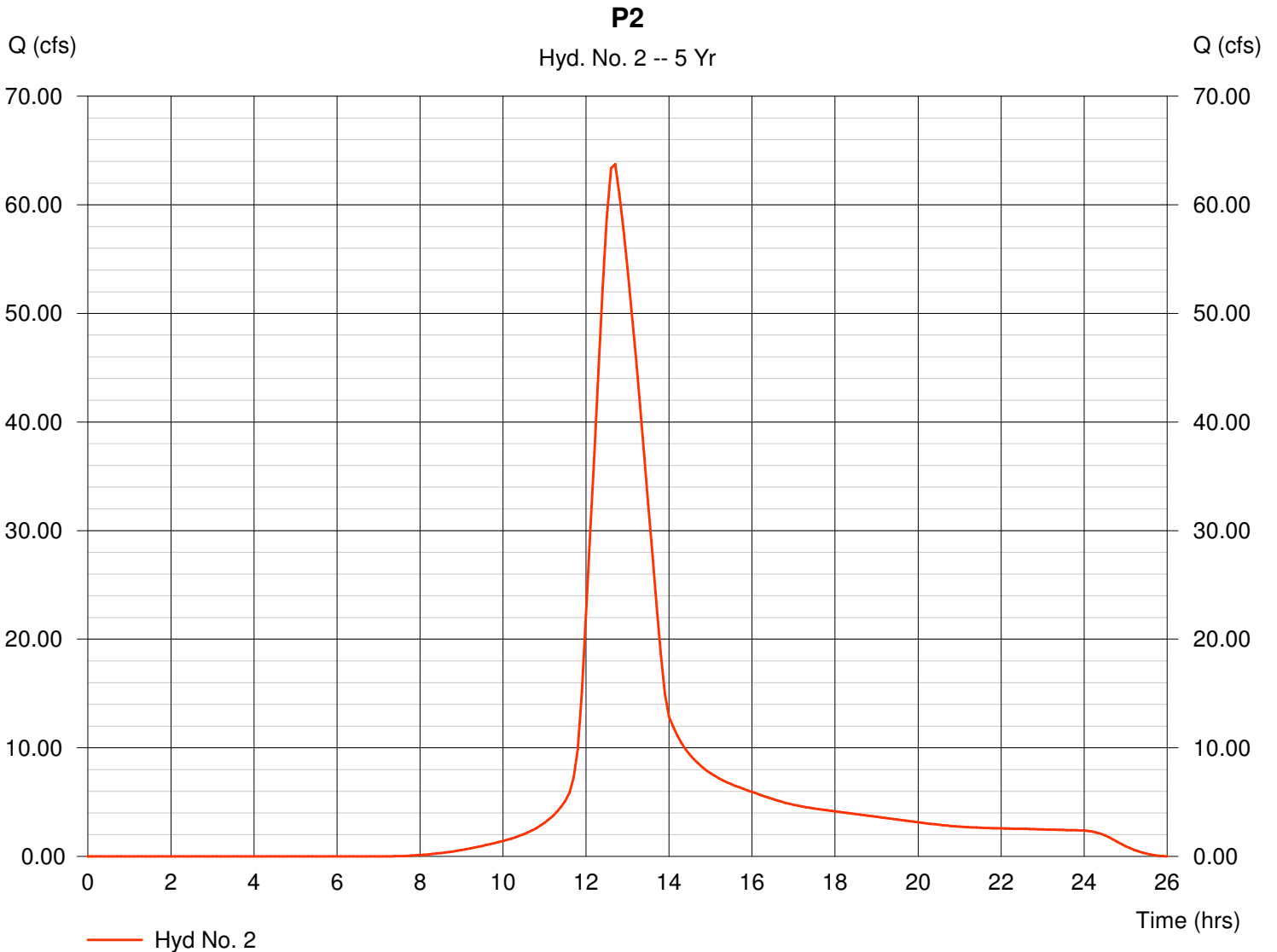
Hyd. No. 2

P2

Hydrograph type = SCS Runoff
Storm frequency = 5 yrs
Drainage area = 52.590 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.55 in
Storm duration = 24 hrs

Peak discharge = 63.76 cfs
Time interval = 6 min
Curve number = 82
Hydraulic length = 0 ft
Time of conc. (Tc) = 71.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 11.561 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 4

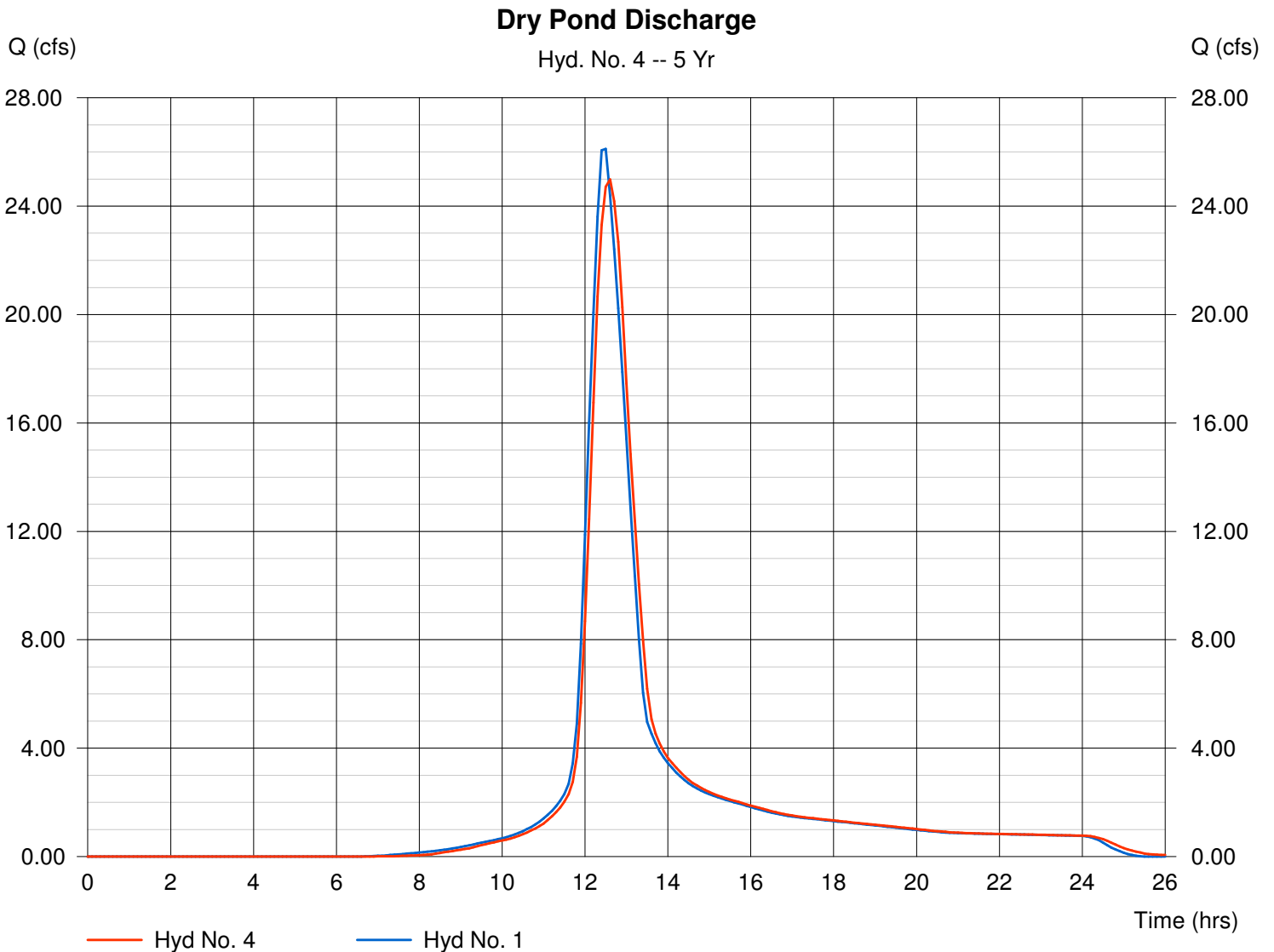
Dry Pond Discharge

Hydrograph type = Reservoir
Storm frequency = 5 yrs
Inflow hyd. No. = 1
Reservoir name = West Pond

Peak discharge = 24.99 cfs
Time interval = 6 min
Max. Elevation = 193.16 ft
Max. Storage = 0.218 acft

Storage Indication method used.

Hydrograph Volume = 3.896 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

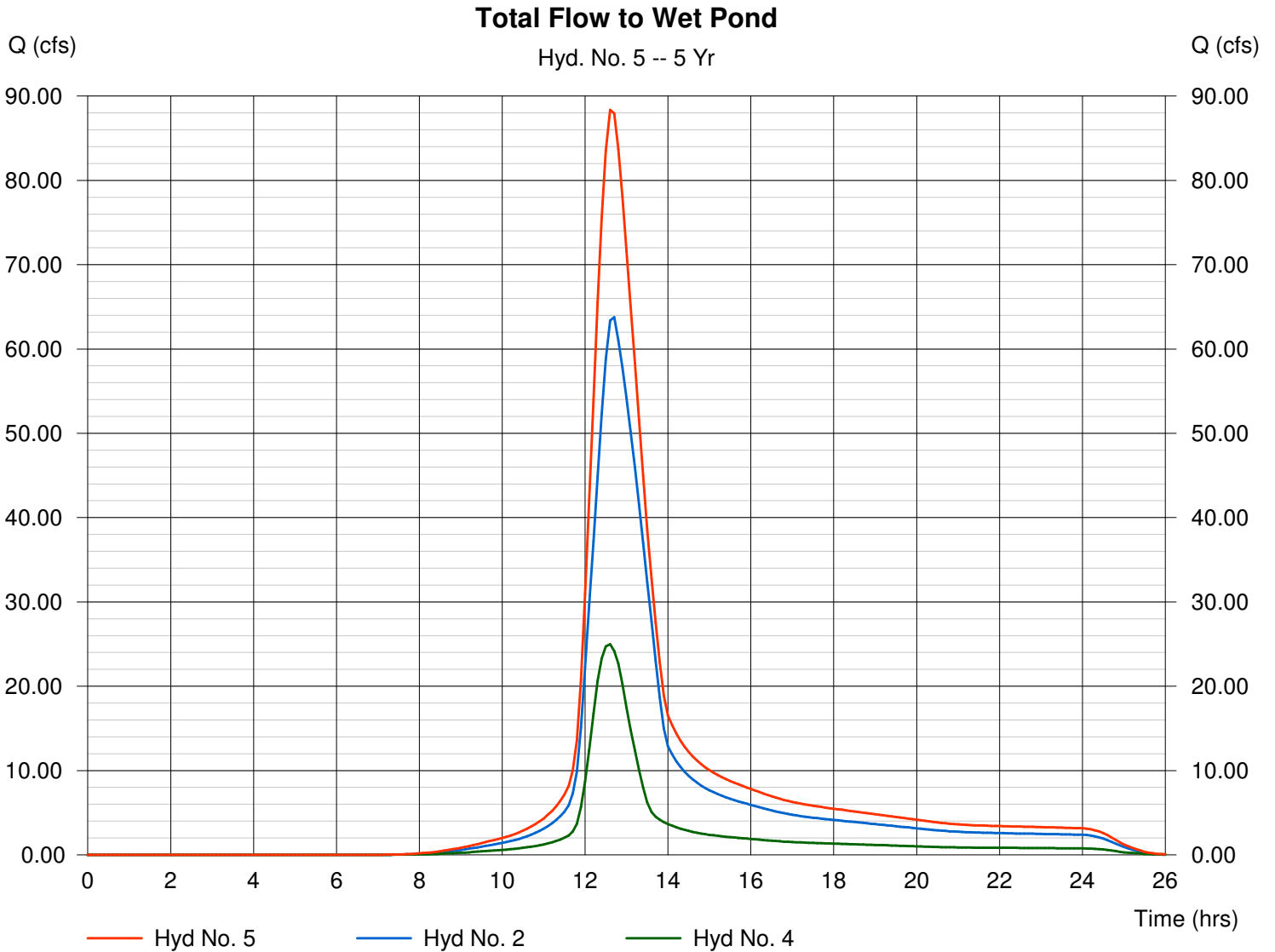
Hyd. No. 5

Total Flow to Wet Pond

Hydrograph type = Combine
Storm frequency = 5 yrs
Inflow hyds. = 2, 4

Peak discharge = 88.35 cfs
Time interval = 6 min

Hydrograph Volume = 15.458 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 6

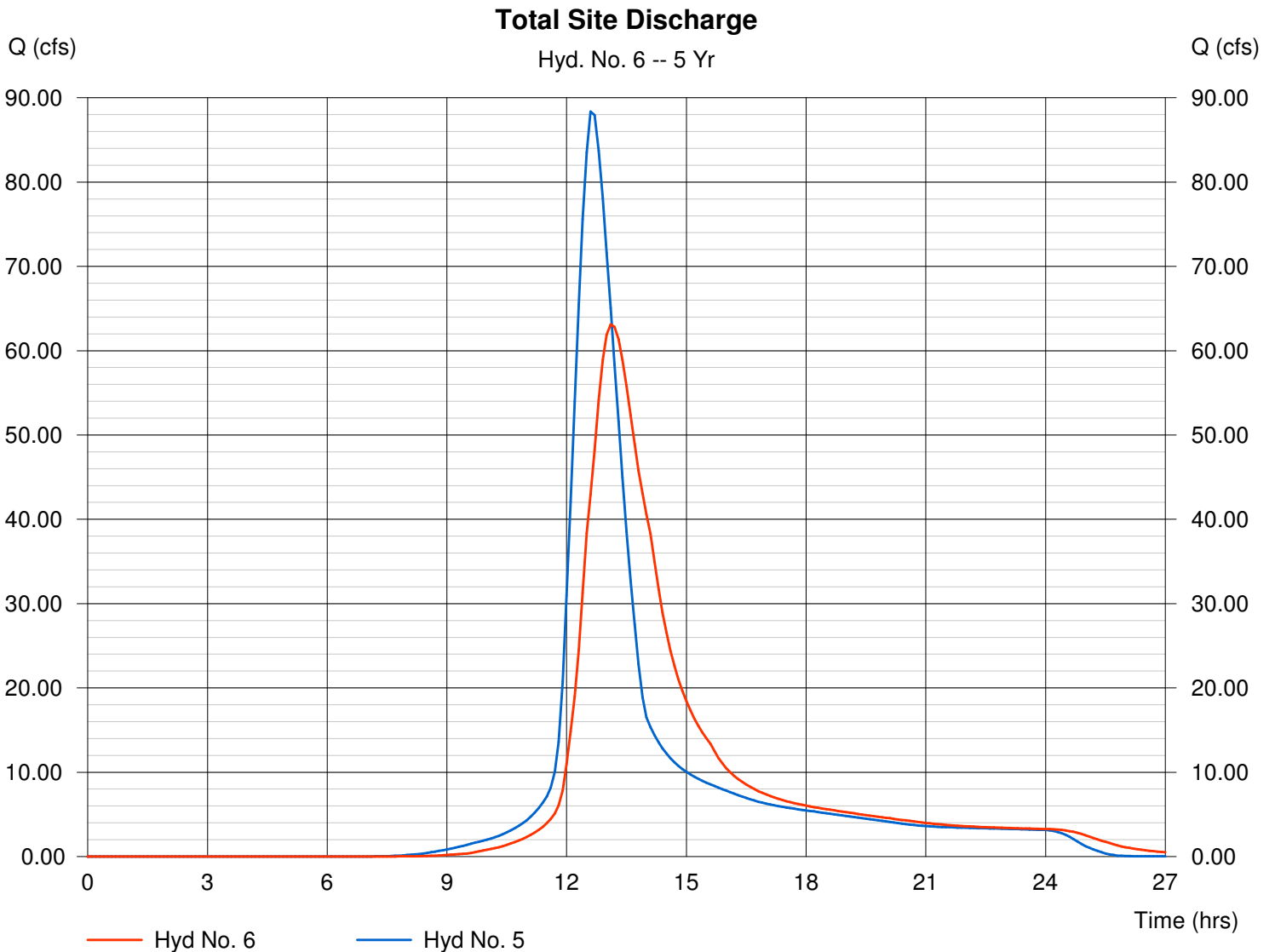
Total Site Discharge

Hydrograph type = Reservoir
Storm frequency = 5 yrs
Inflow hyd. No. = 5
Reservoir name = East Pond

Peak discharge = 63.12 cfs
Time interval = 6 min
Max. Elevation = 193.61 ft
Max. Storage = 3.551 acft

Storage Indication method used.

Hydrograph Volume = 15.458 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	31.88	6	744	4.766	---	-----	-----	P1
2	SCS Runoff	78.63	6	762	14.252	---	-----	-----	P2
4	Reservoir	29.88	6	756	4.766	1	193.60	0.287	Dry Pond Discharge
5	Combine	108.22	6	756	19.017	2, 4	-----	-----	Total Flow to Wet Pond
6	Reservoir	82.14	6	786	19.017	5	193.88	4.214	Total Site Discharge

06403_Proposed_Basins.gpw	Return Period: 10 Year	Monday, May 7 2007, 8:04 AM
---------------------------	------------------------	-----------------------------

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

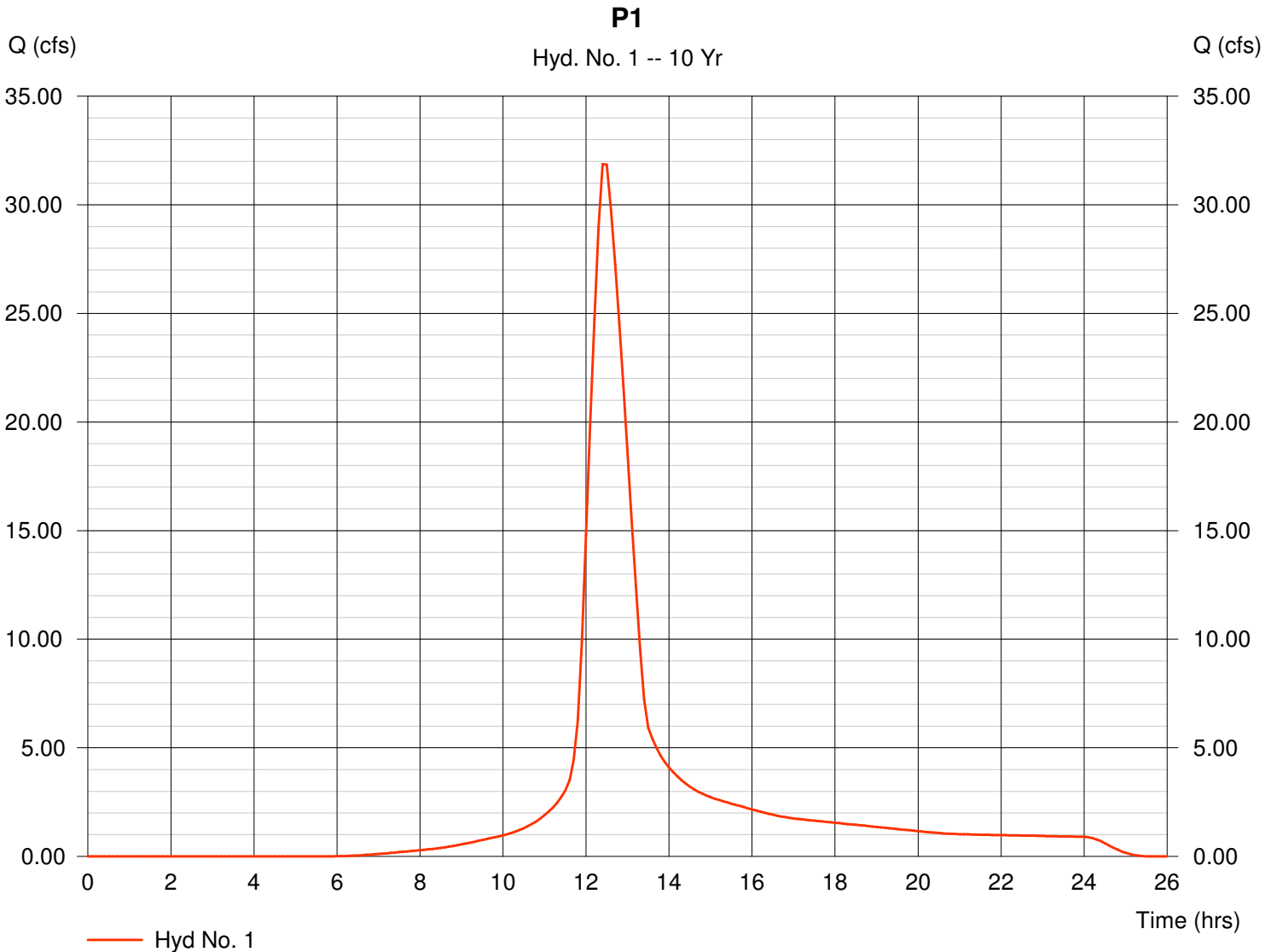
Hyd. No. 1

P1

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 16.340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.25 in
Storm duration = 24 hrs

Peak discharge = 31.88 cfs
Time interval = 6 min
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 54.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 4.766 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

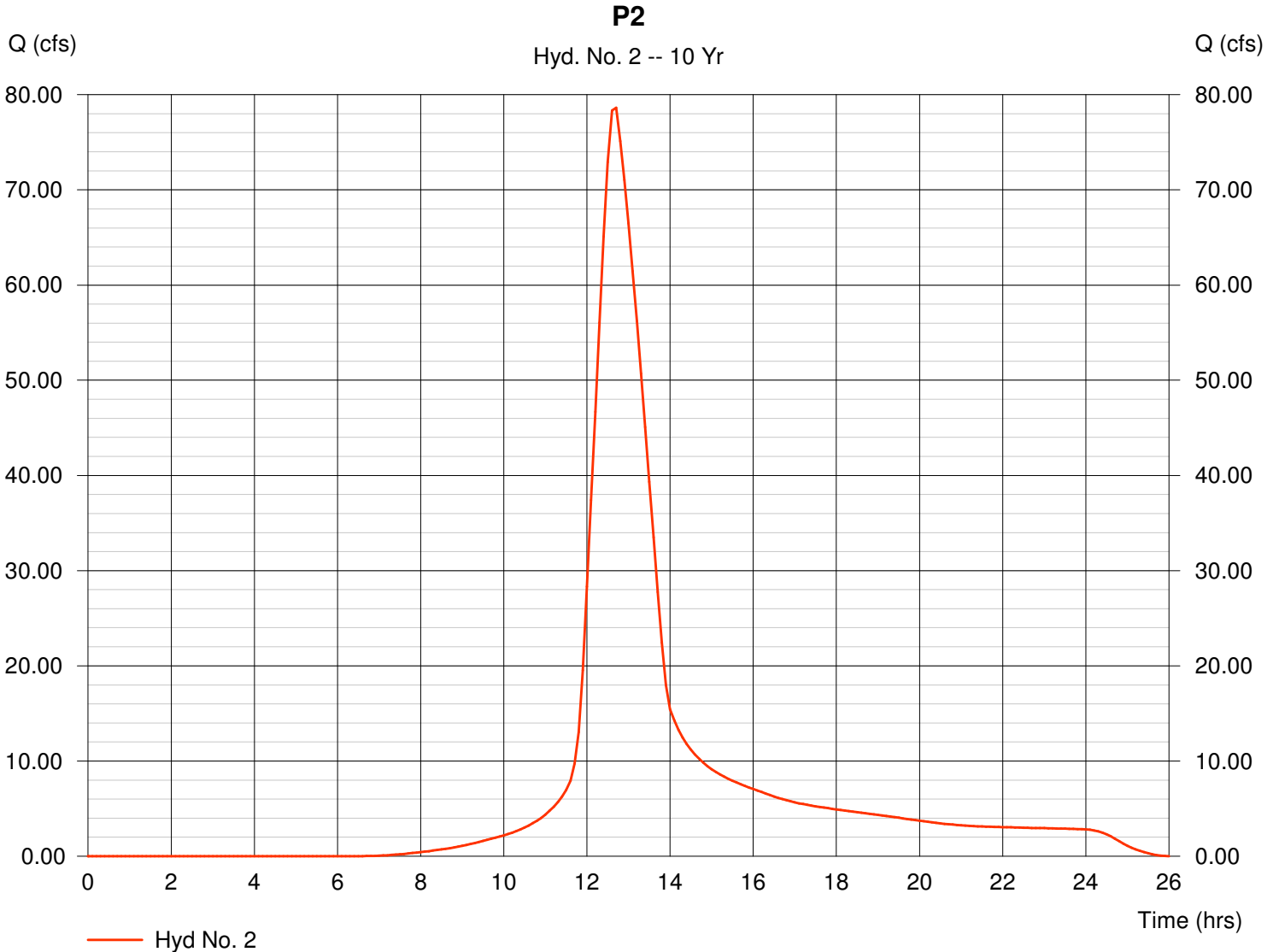
Hyd. No. 2

P2

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 52.590 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.25 in
Storm duration = 24 hrs

Peak discharge = 78.63 cfs
Time interval = 6 min
Curve number = 82
Hydraulic length = 0 ft
Time of conc. (Tc) = 71.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 14.252 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 4

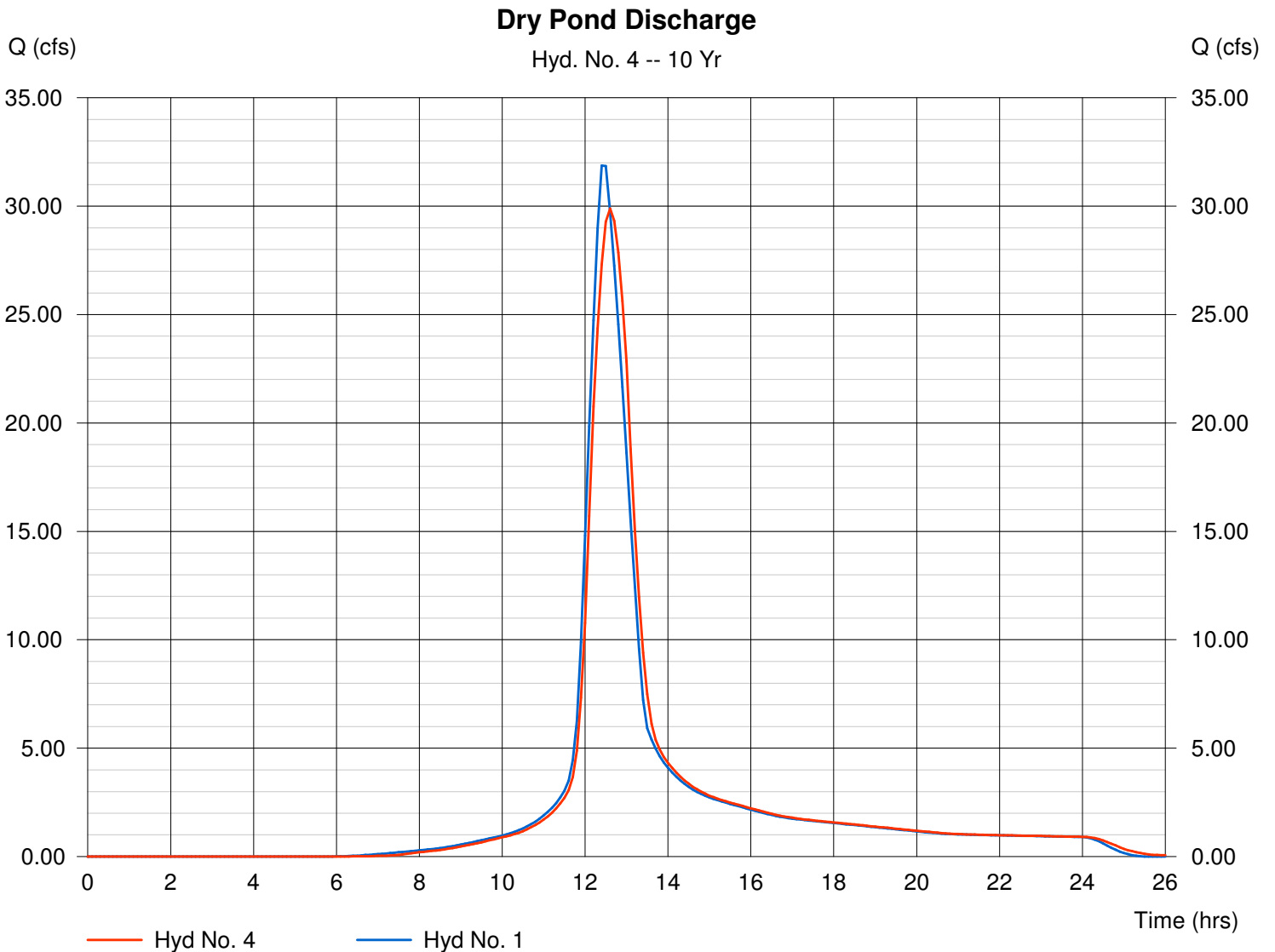
Dry Pond Discharge

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Inflow hyd. No. = 1
Reservoir name = West Pond

Peak discharge = 29.88 cfs
Time interval = 6 min
Max. Elevation = 193.60 ft
Max. Storage = 0.287 acft

Storage Indication method used.

Hydrograph Volume = 4.766 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 5

Total Flow to Wet Pond

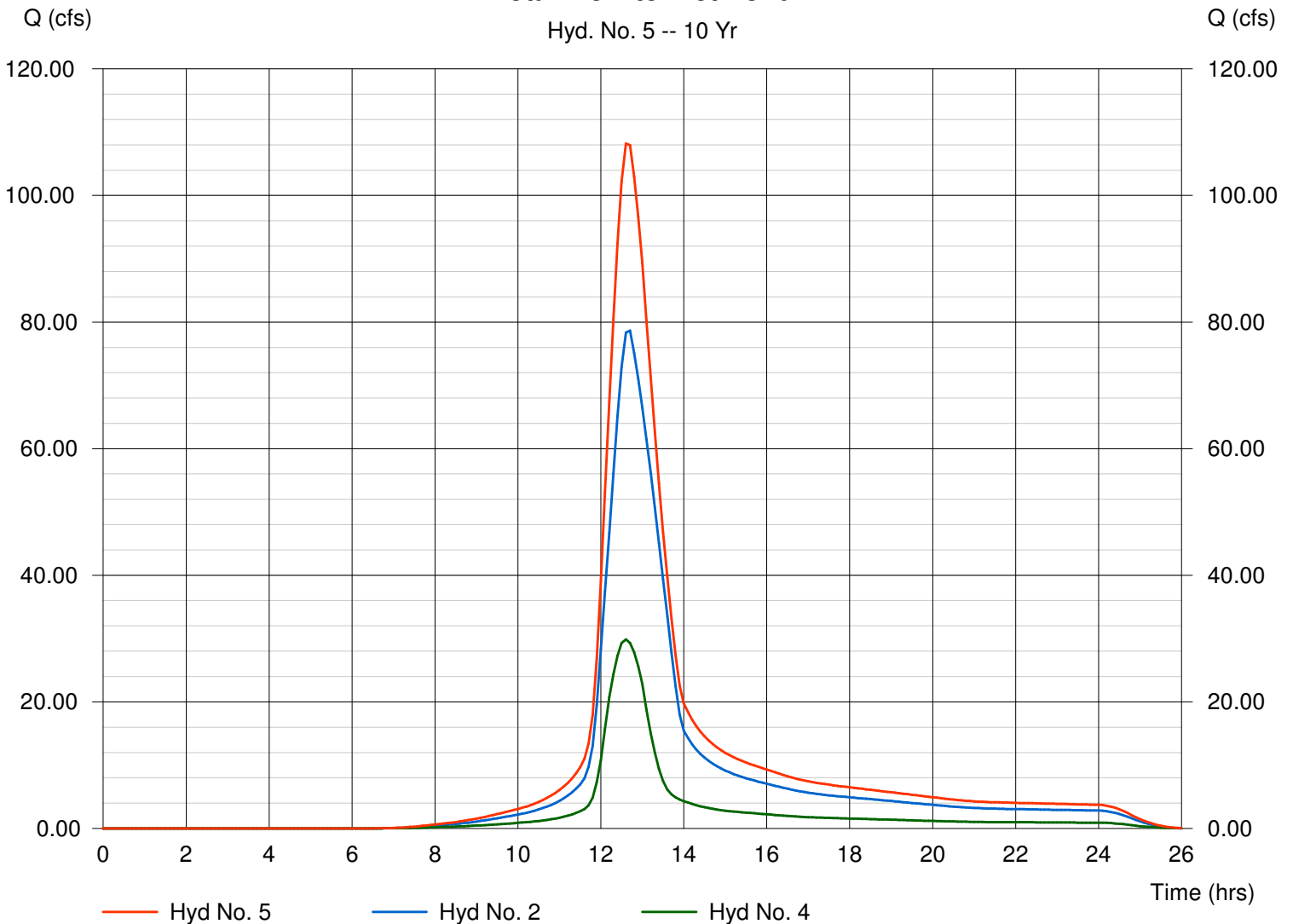
Hydrograph type = Combine
Storm frequency = 10 yrs
Inflow hyds. = 2, 4

Peak discharge = 108.22 cfs
Time interval = 6 min

Hydrograph Volume = 19.017 acft

Total Flow to Wet Pond

Hyd. No. 5 -- 10 Yr



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 6

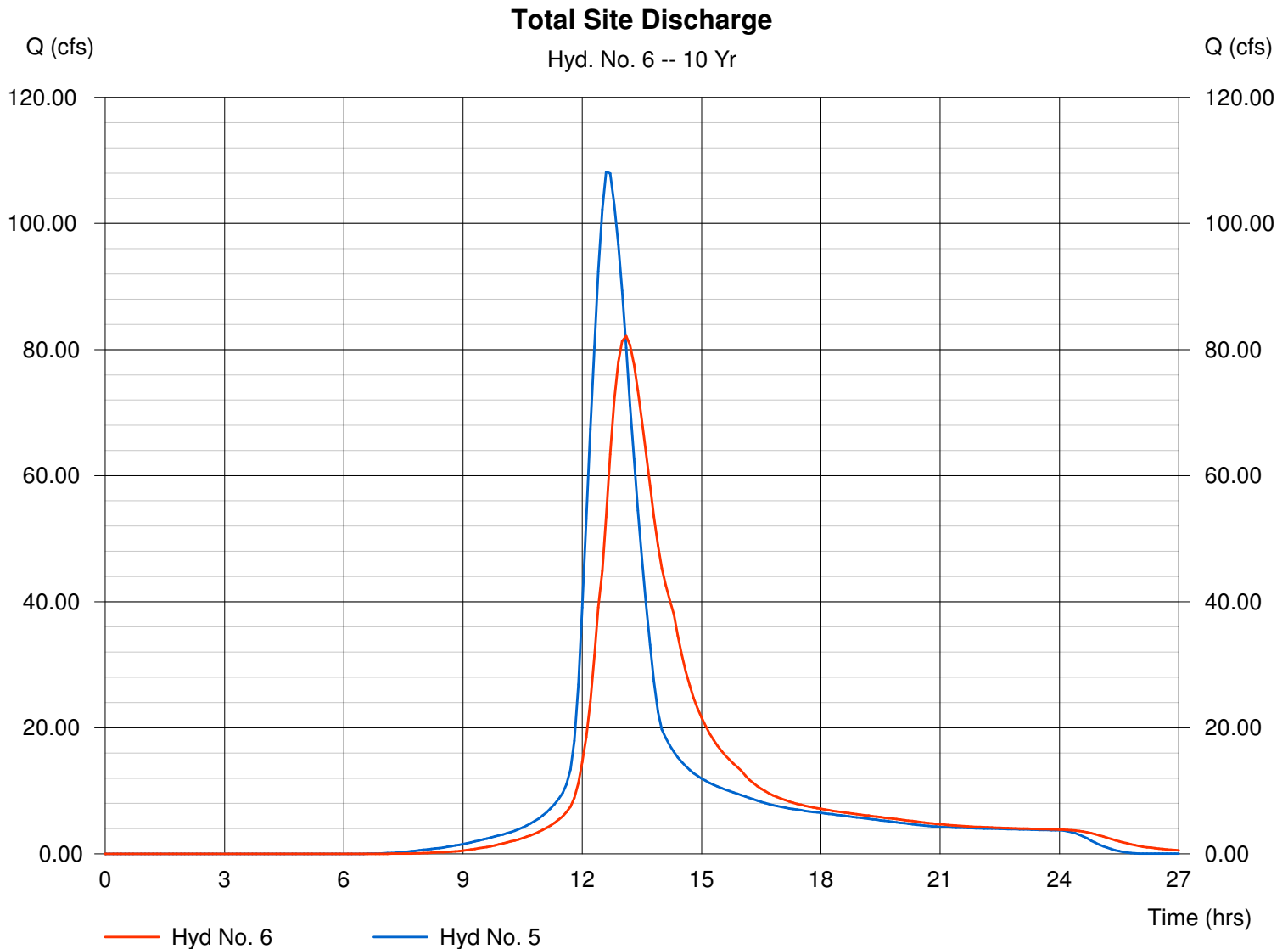
Total Site Discharge

Hydrograph type = Reservoir
Storm frequency = 10 yrs
Inflow hyd. No. = 5
Reservoir name = East Pond

Peak discharge = 82.14 cfs
Time interval = 6 min
Max. Elevation = 193.88 ft
Max. Storage = 4.214 acft

Storage Indication method used.

Hydrograph Volume = 19.017 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	40.68	6	744	6.098	---	-----	-----	P1
2	SCS Runoff	101.24	6	762	18.395	---	-----	-----	P2
4	Reservoir	38.39	6	756	6.097	1	194.29	0.411	Dry Pond Discharge
5	Combine	139.54	6	756	24.492	2, 4	-----	-----	Total Flow to Wet Pond
6	Reservoir	108.93	6	786	24.492	5	194.17	5.122	Total Site Discharge

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

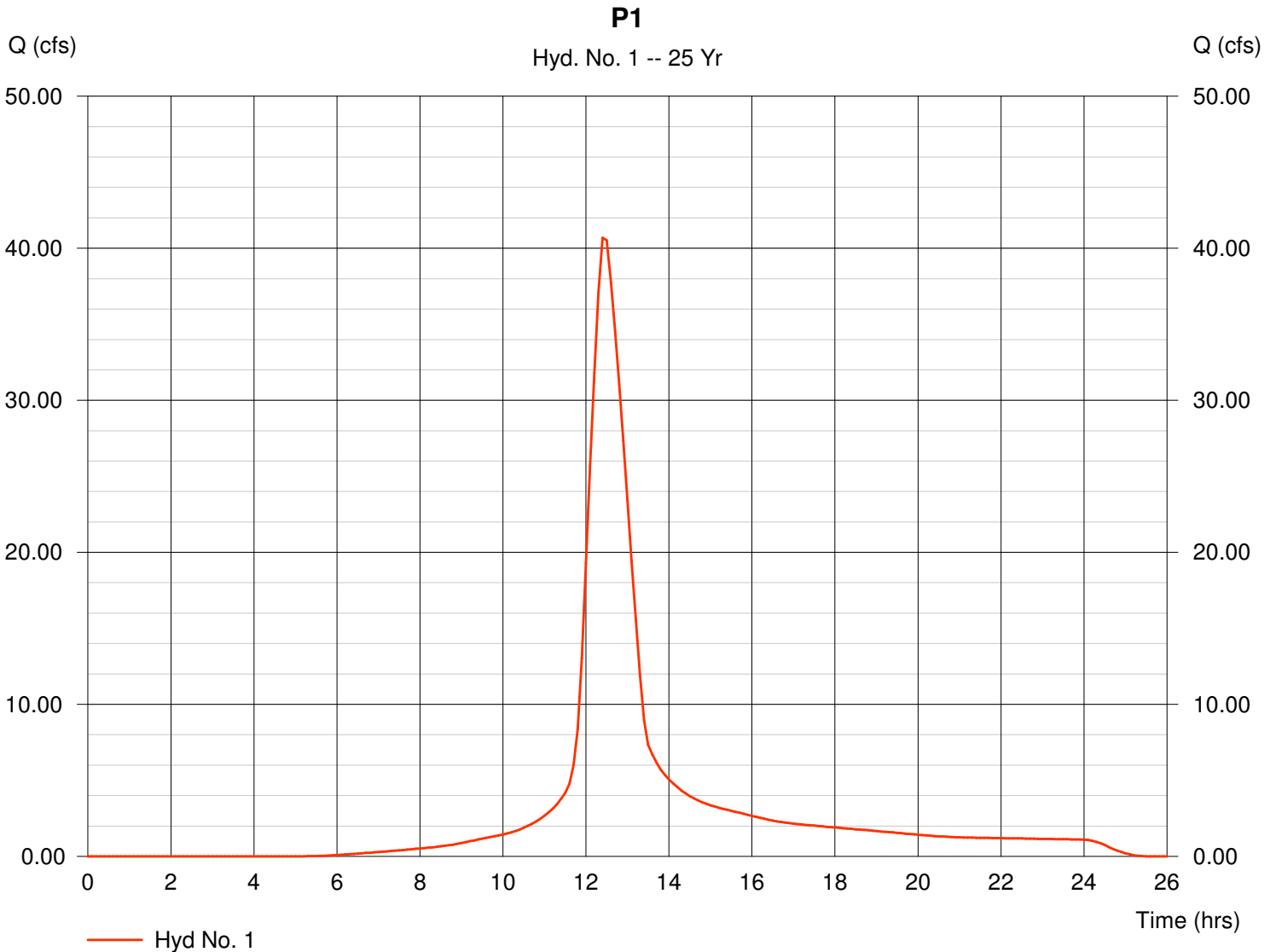
Hyd. No. 1

P1

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 16.340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 6.30 in
Storm duration = 24 hrs

Peak discharge = 40.68 cfs
Time interval = 6 min
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 54.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 6.098 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

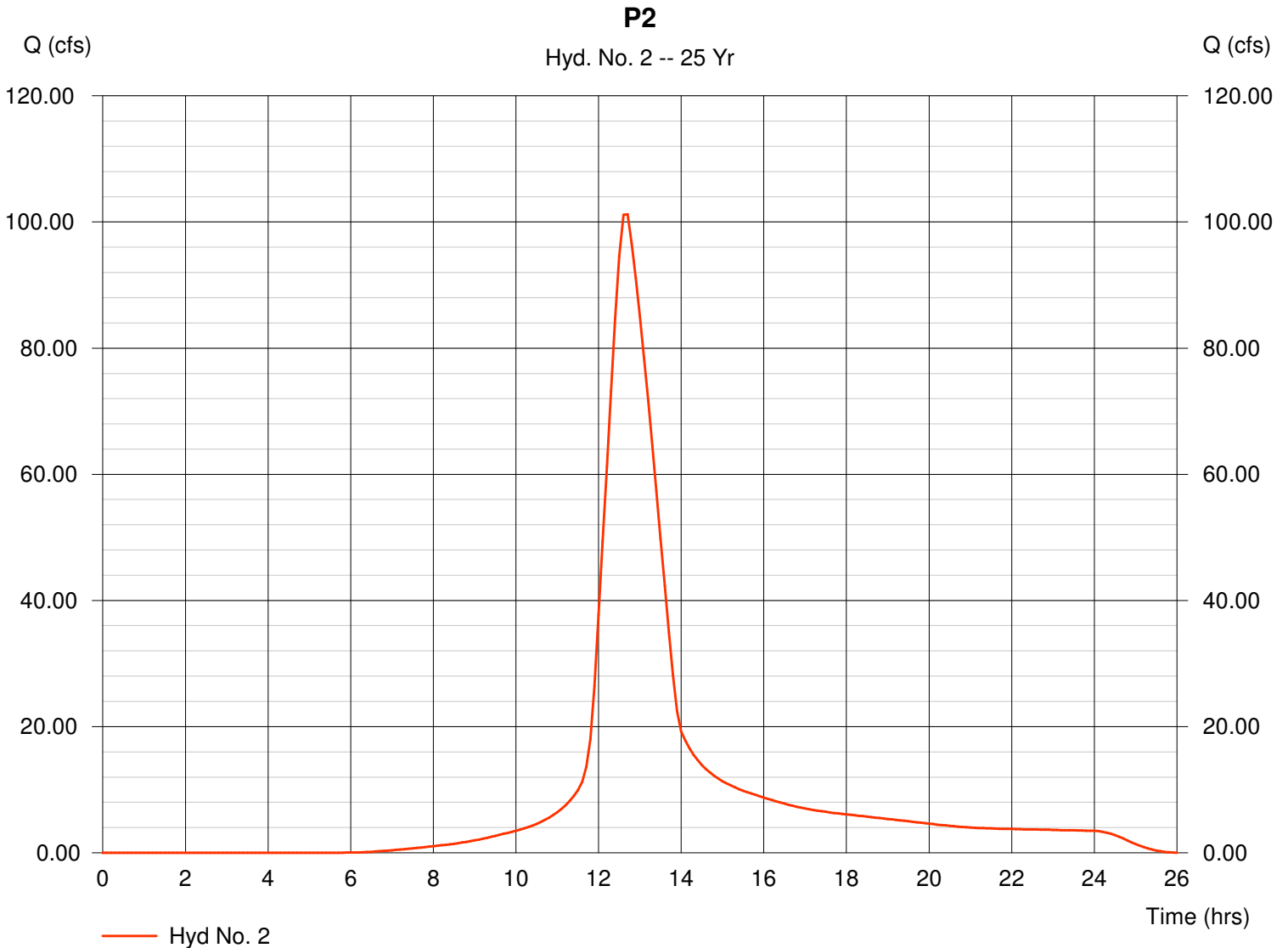
Hyd. No. 2

P2

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 52.590 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 6.30 in
Storm duration = 24 hrs

Peak discharge = 101.24 cfs
Time interval = 6 min
Curve number = 82
Hydraulic length = 0 ft
Time of conc. (Tc) = 71.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 18.395 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 4

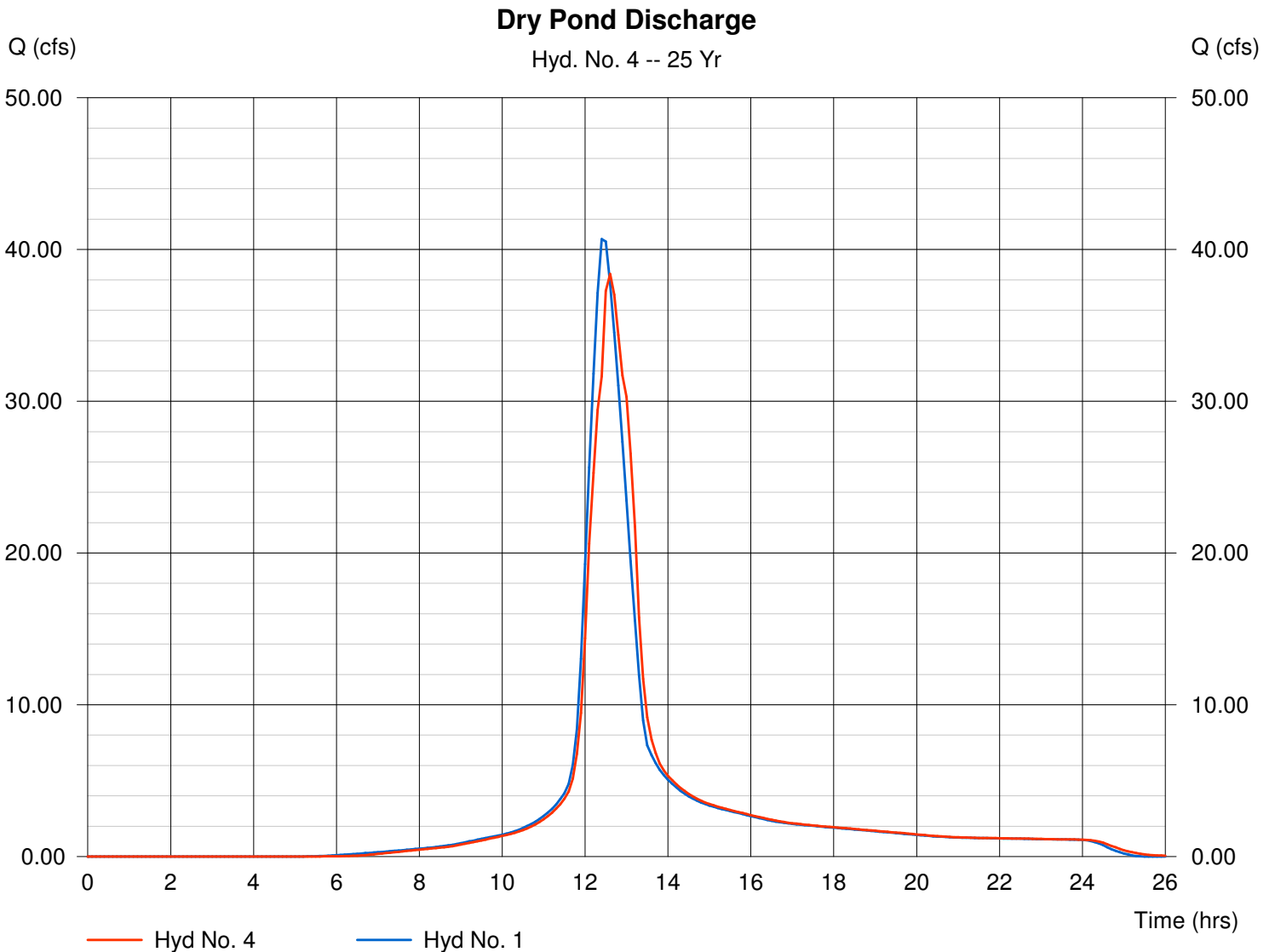
Dry Pond Discharge

Hydrograph type = Reservoir
Storm frequency = 25 yrs
Inflow hyd. No. = 1
Reservoir name = West Pond

Peak discharge = 38.39 cfs
Time interval = 6 min
Max. Elevation = 194.29 ft
Max. Storage = 0.411 acft

Storage Indication method used.

Hydrograph Volume = 6.097 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 5

Total Flow to Wet Pond

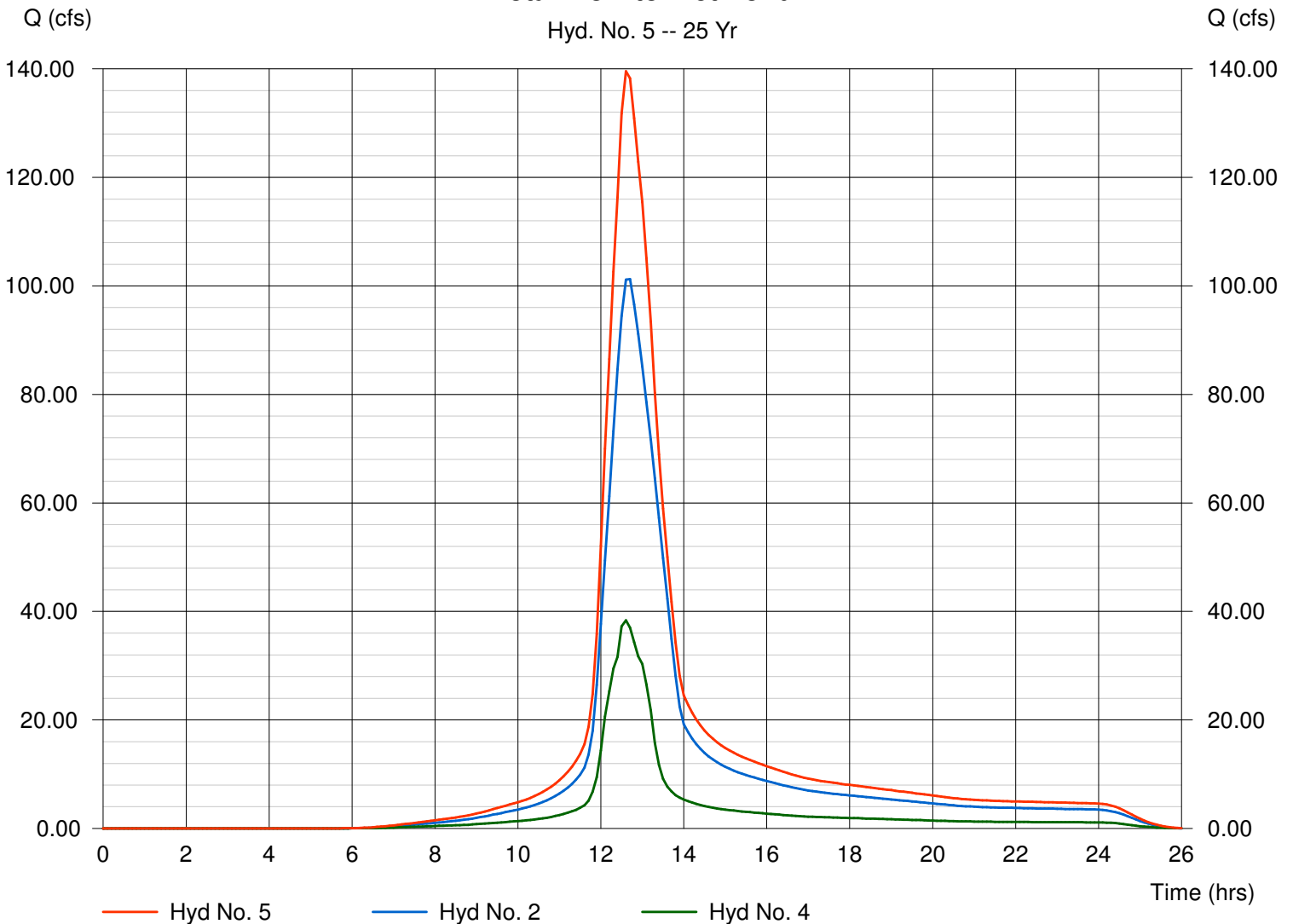
Hydrograph type = Combine
Storm frequency = 25 yrs
Inflow hyds. = 2, 4

Peak discharge = 139.54 cfs
Time interval = 6 min

Hydrograph Volume = 24.492 acft

Total Flow to Wet Pond

Hyd. No. 5 -- 25 Yr



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 6

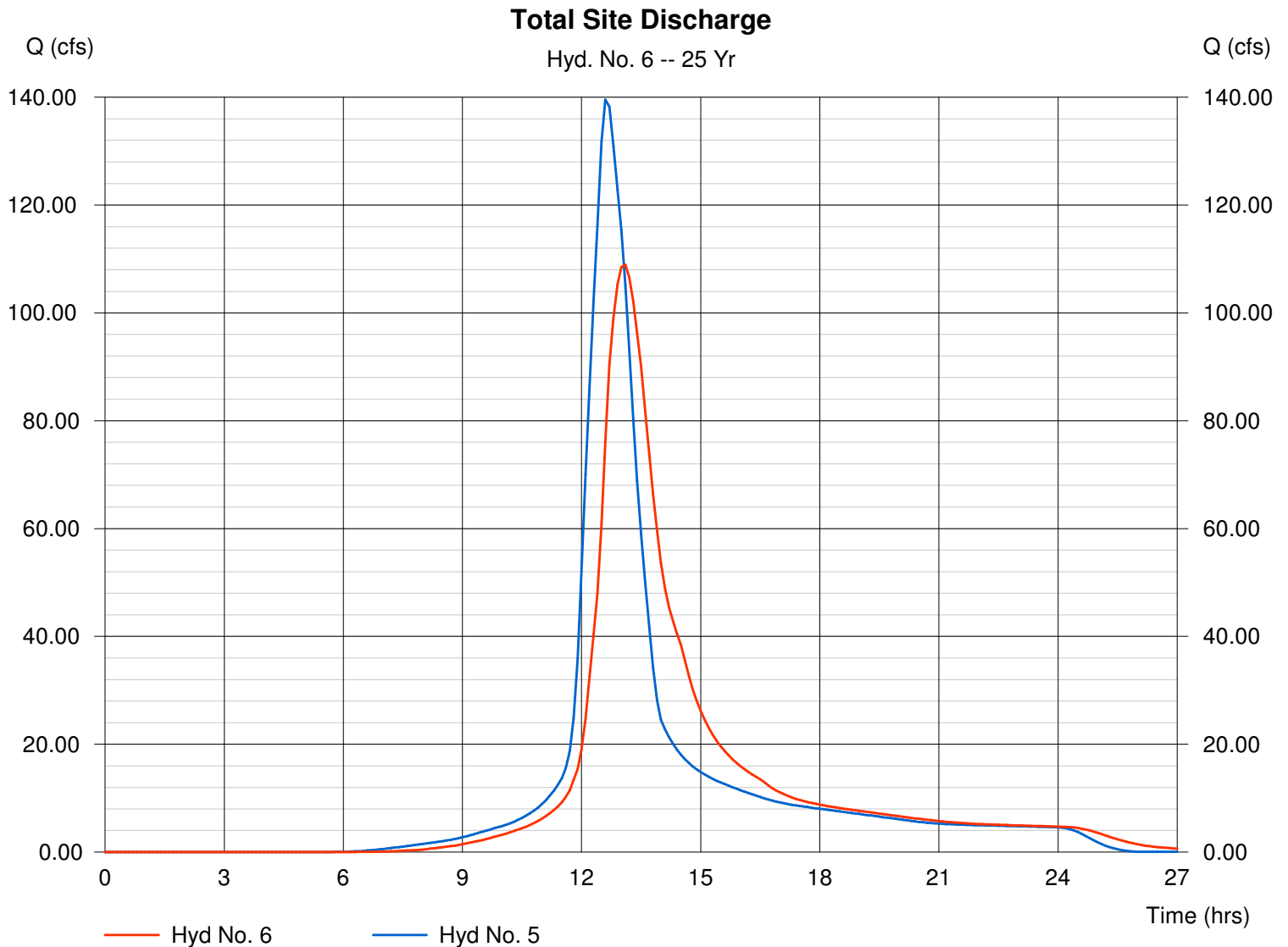
Total Site Discharge

Hydrograph type = Reservoir
Storm frequency = 25 yrs
Inflow hyd. No. = 5
Reservoir name = East Pond

Peak discharge = 108.93 cfs
Time interval = 6 min
Max. Elevation = 194.17 ft
Max. Storage = 5.122 acft

Storage Indication method used.

Hydrograph Volume = 24.492 acft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (acft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (acft)	Hydrograph description
1	SCS Runoff	53.30	6	744	8.038	---	-----	-----	P1
2	SCS Runoff	134.05	6	756	24.461	---	-----	-----	P2
4	Reservoir	50.15	6	756	8.038	1	194.91	0.542	Dry Pond Discharge
5	Combine	184.20	6	756	32.499	2, 4	-----	-----	Total Flow to Wet Pond
6	Reservoir	151.31	6	780	32.499	5	194.48	6.255	Total Site Discharge

06403_Proposed_Basins.gpw	Return Period: 100 Year	Monday, May 7 2007, 8:04 AM
---------------------------	-------------------------	-----------------------------

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

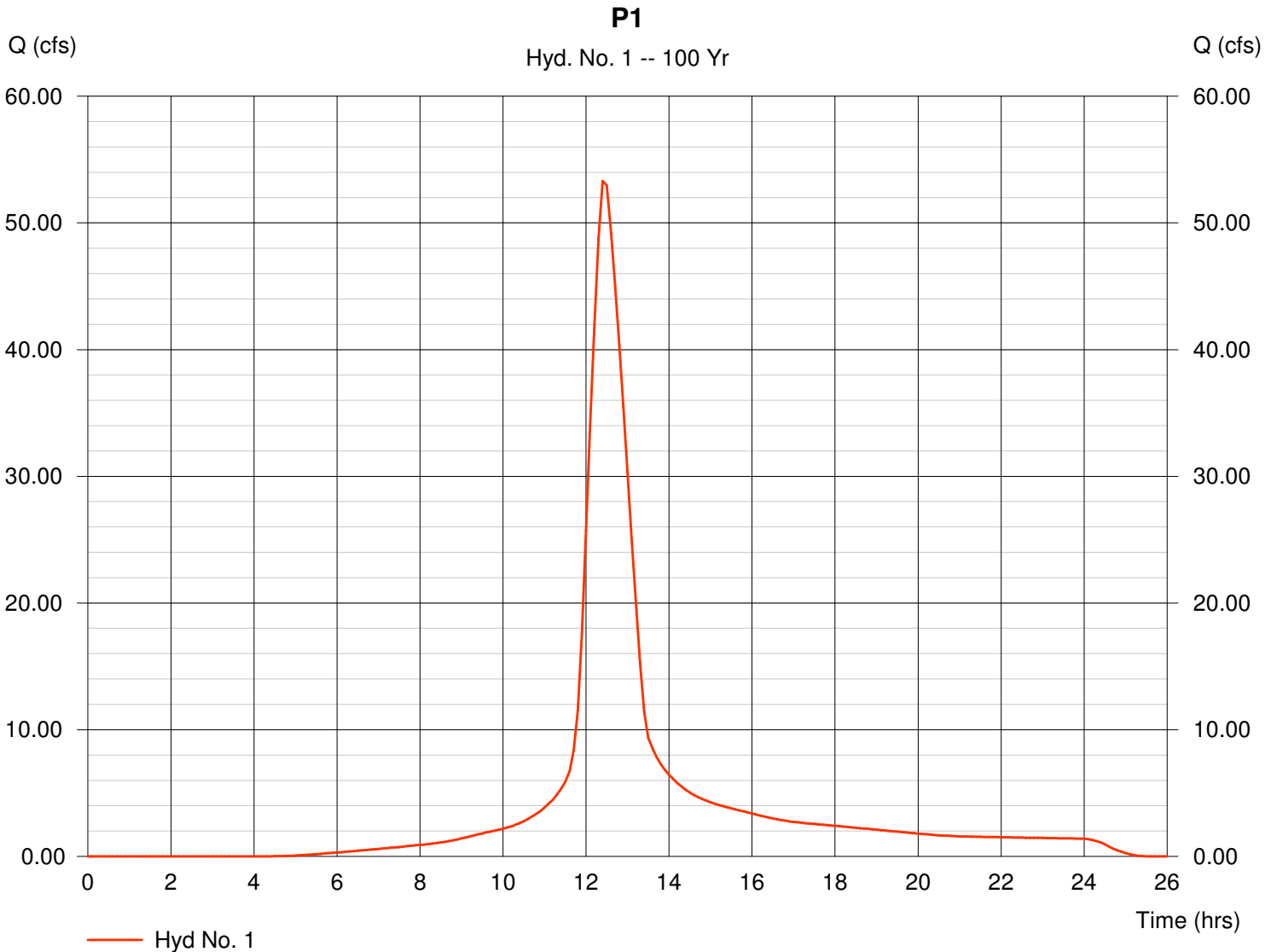
Hyd. No. 1

P1

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 16.340 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.80 in
Storm duration = 24 hrs

Peak discharge = 53.30 cfs
Time interval = 6 min
Curve number = 84
Hydraulic length = 0 ft
Time of conc. (Tc) = 54.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 8.038 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

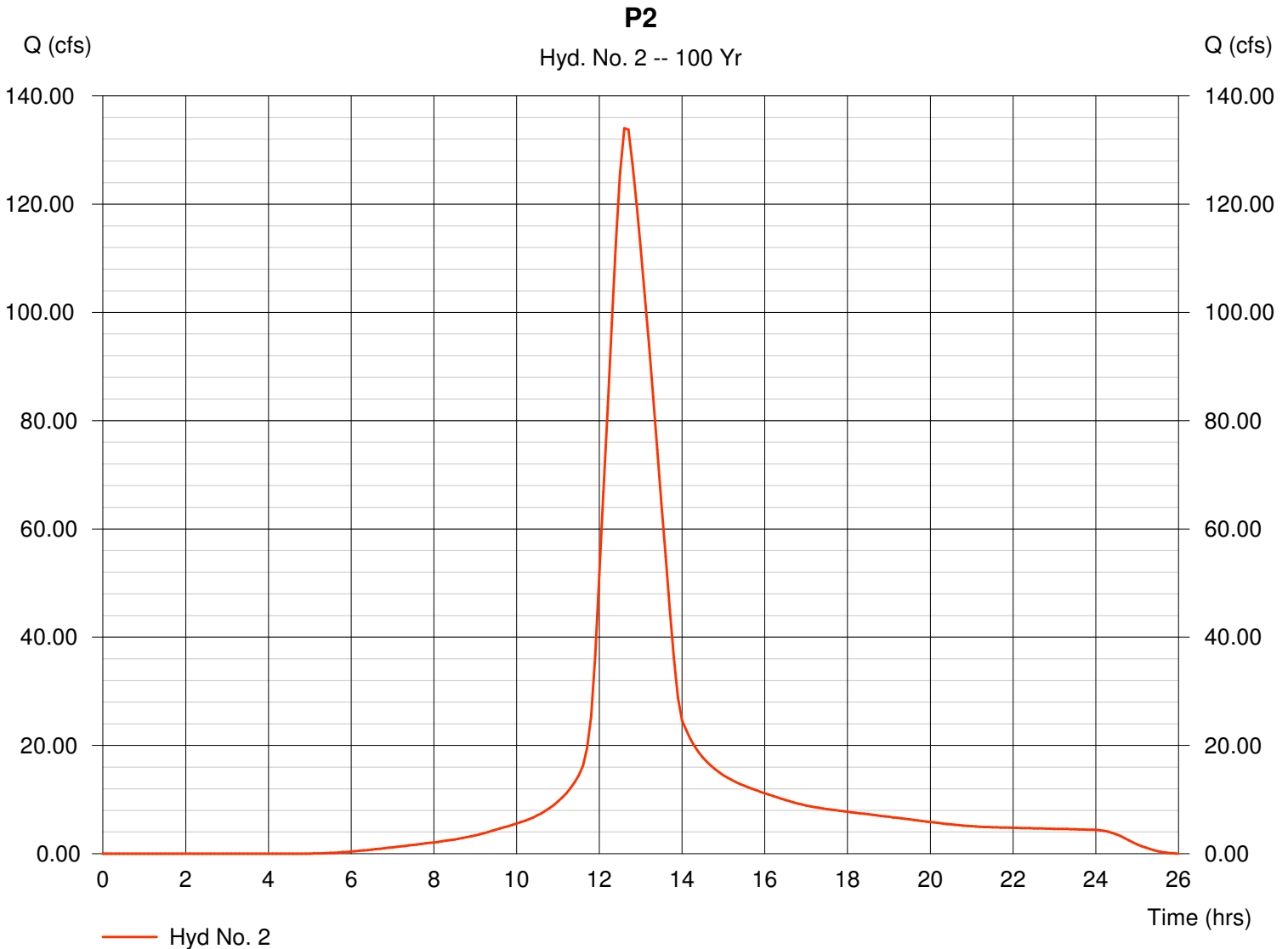
Hyd. No. 2

P2

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 52.590 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.80 in
Storm duration = 24 hrs

Peak discharge = 134.05 cfs
Time interval = 6 min
Curve number = 82
Hydraulic length = 0 ft
Time of conc. (Tc) = 71.00 min
Distribution = Type II
Shape factor = 484

Hydrograph Volume = 24.461 acft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 4

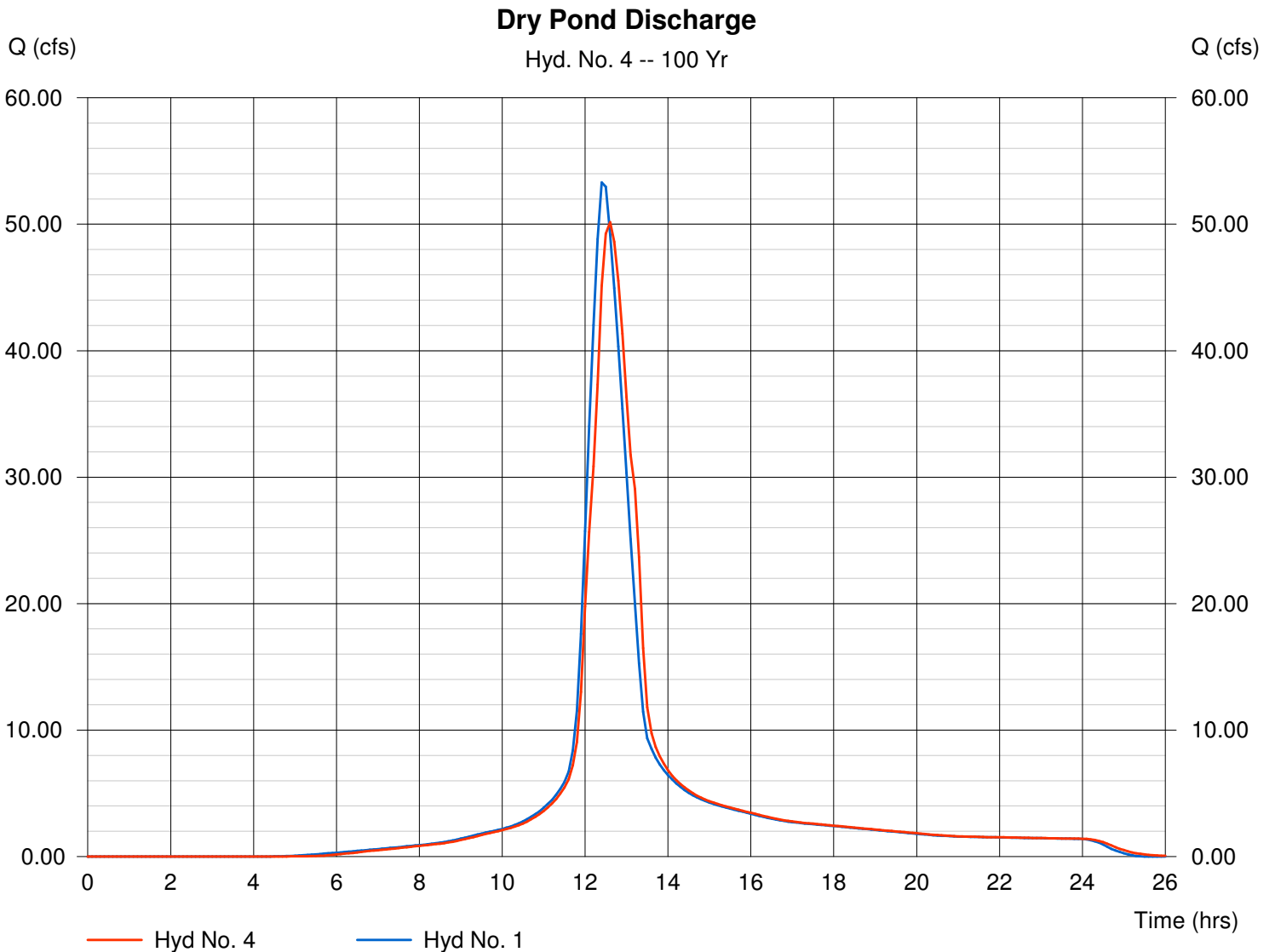
Dry Pond Discharge

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Inflow hyd. No. = 1
Reservoir name = West Pond

Peak discharge = 50.15 cfs
Time interval = 6 min
Max. Elevation = 194.91 ft
Max. Storage = 0.542 acft

Storage Indication method used.

Hydrograph Volume = 8.038 acft



Pond Report

Pond No. 3 - West Pond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	191.00	2,668	0.000	0.000
1.00	192.00	4,109	0.078	0.078
2.00	193.00	5,859	0.114	0.192
3.00	194.00	7,949	0.158	0.351
4.00	195.00	10,393	0.211	0.561

Culvert / Orifice Structures

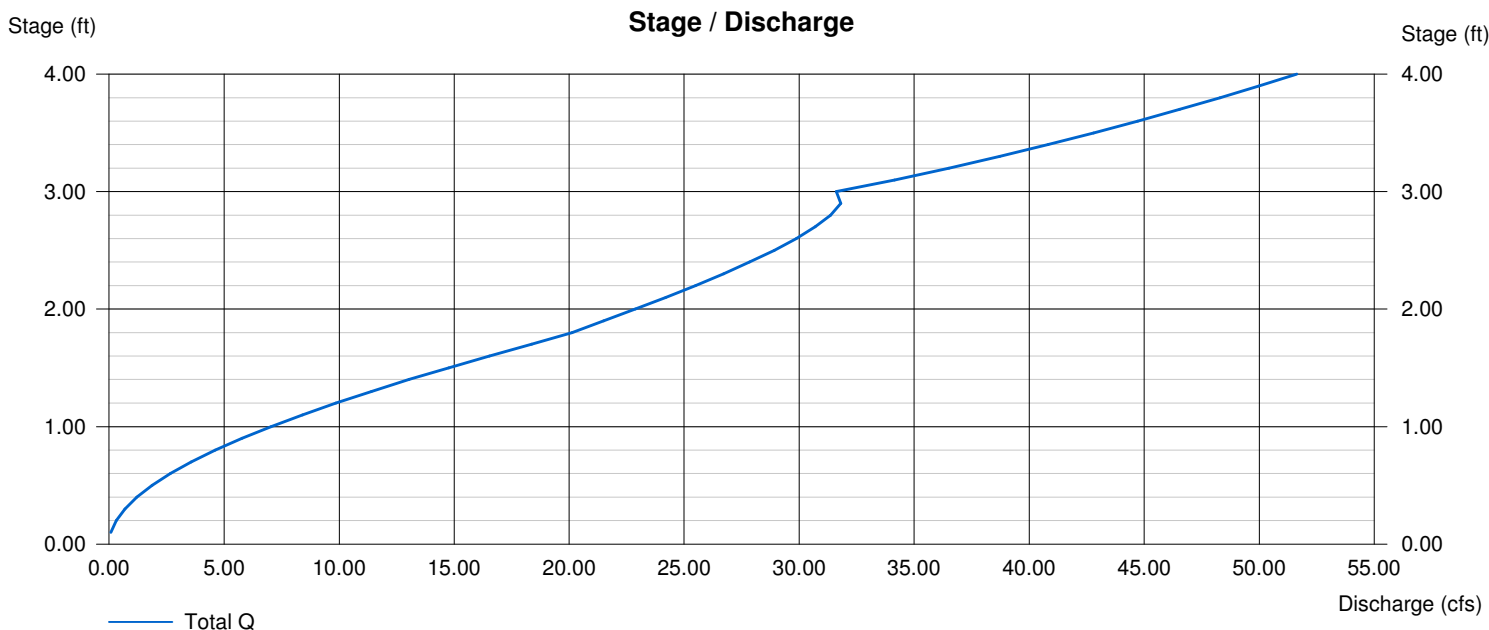
	[A]	[B]	[C]	[D]
Rise (in)	= 36.00	0.00	0.00	0.00
Span (in)	= 36.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 191.00	0.00	0.00	0.00
Length (ft)	= 60.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 5

Total Flow to Wet Pond

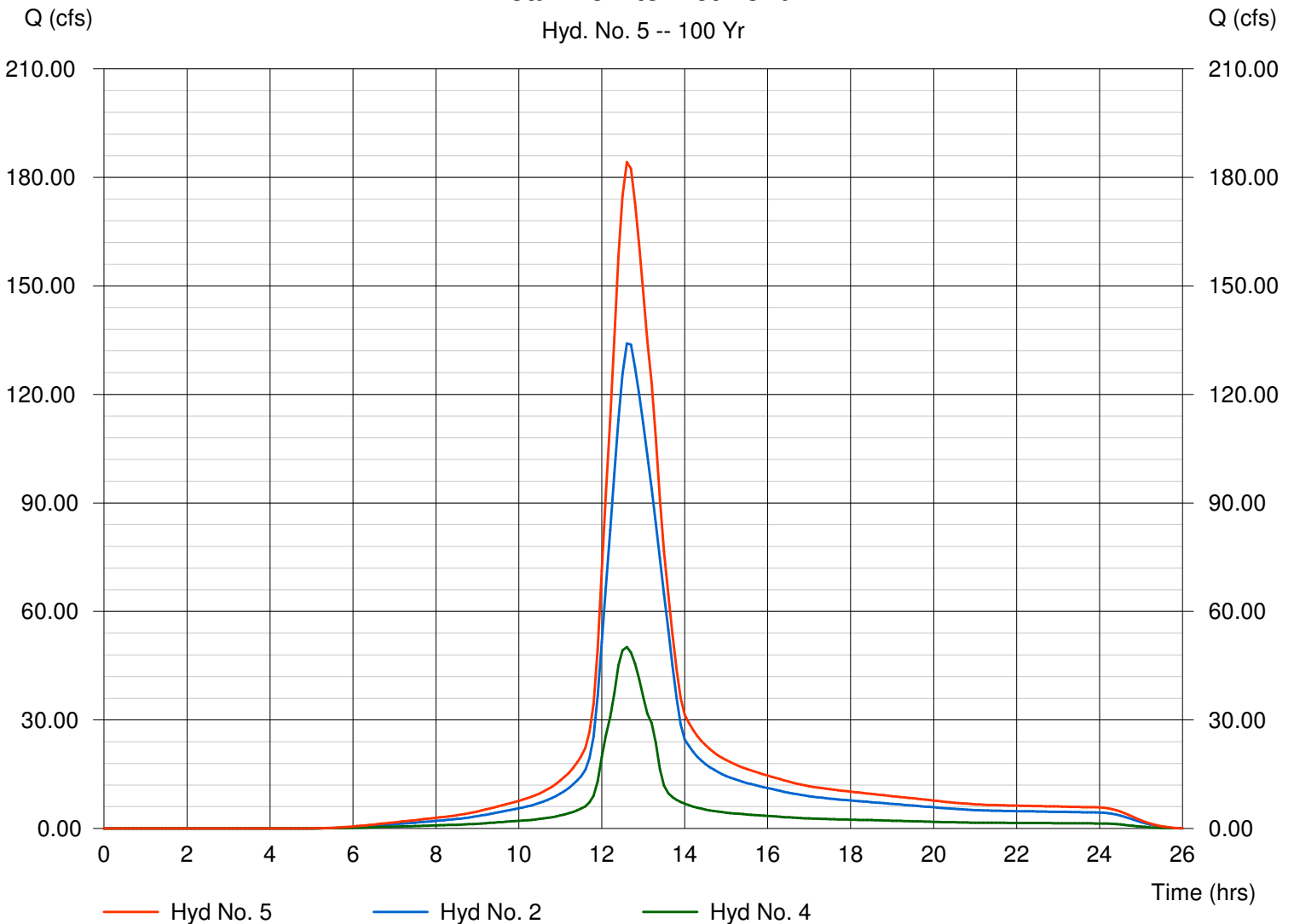
Hydrograph type = Combine
Storm frequency = 100 yrs
Inflow hyds. = 2, 4

Peak discharge = 184.20 cfs
Time interval = 6 min

Hydrograph Volume = 32.499 acft

Total Flow to Wet Pond

Hyd. No. 5 -- 100 Yr



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Hyd. No. 6

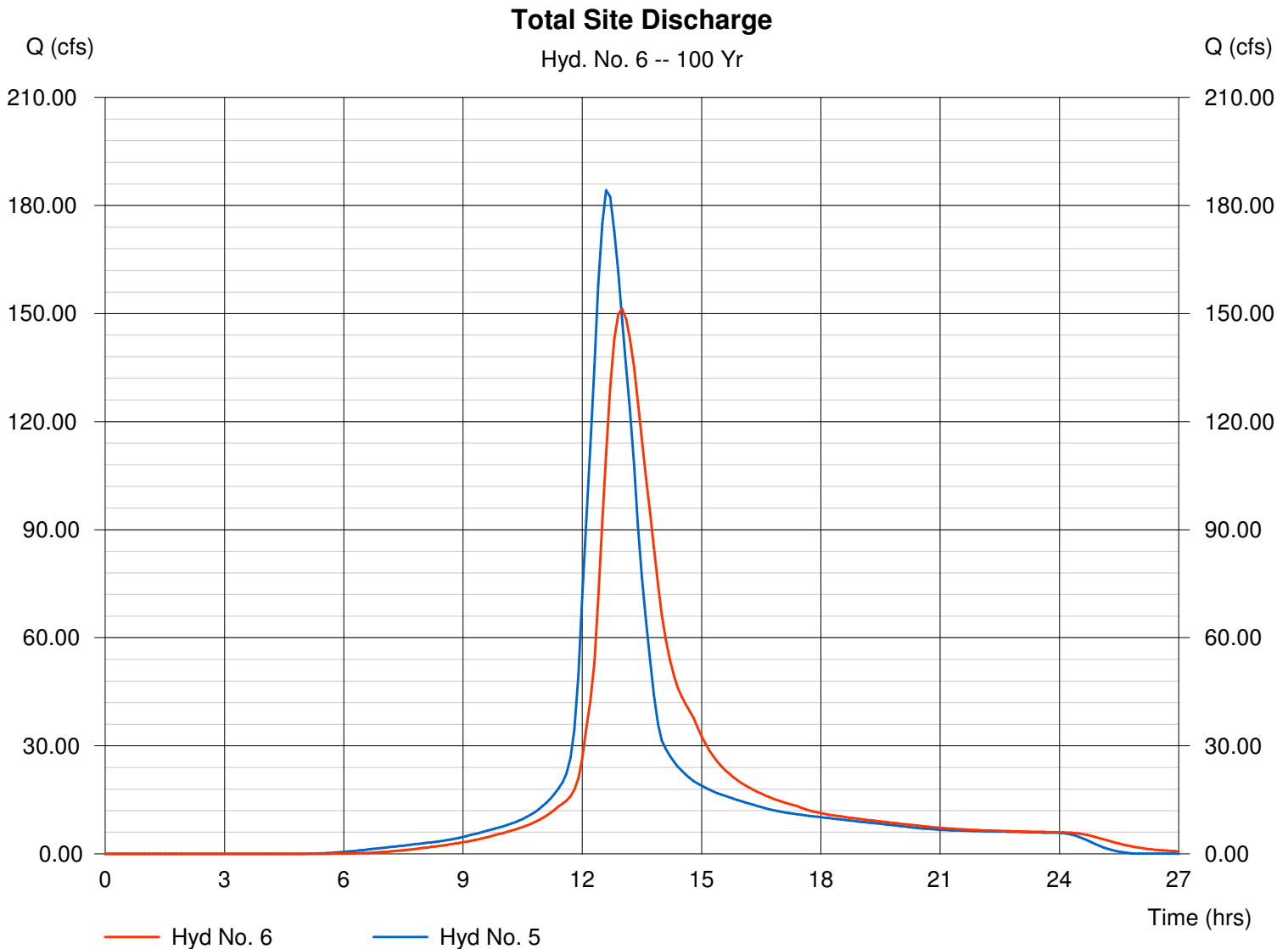
Total Site Discharge

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Inflow hyd. No. = 5
Reservoir name = East Pond

Peak discharge = 151.31 cfs
Time interval = 6 min
Max. Elevation = 194.48 ft
Max. Storage = 6.255 acft

Storage Indication method used.

Hydrograph Volume = 32.499 acft



Pond Report

Hydraflow Hydrographs by Intelisolve

Monday, May 7 2007, 8:4 AM

Pond No. 2 - East Pond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (acft)	Total storage (acft)
0.00	191.00	28,176	0.000	0.000
1.00	192.00	39,495	0.777	0.777
2.00	193.00	76,882	1.336	2.113
3.00	194.00	129,984	2.374	4.487
3.50	194.50	193,336	1.856	6.343

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	10.00	18.00	0.00
Crest El. (ft)	= 191.00	193.25	194.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	Rect	---
Multi-Stage	= No	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.

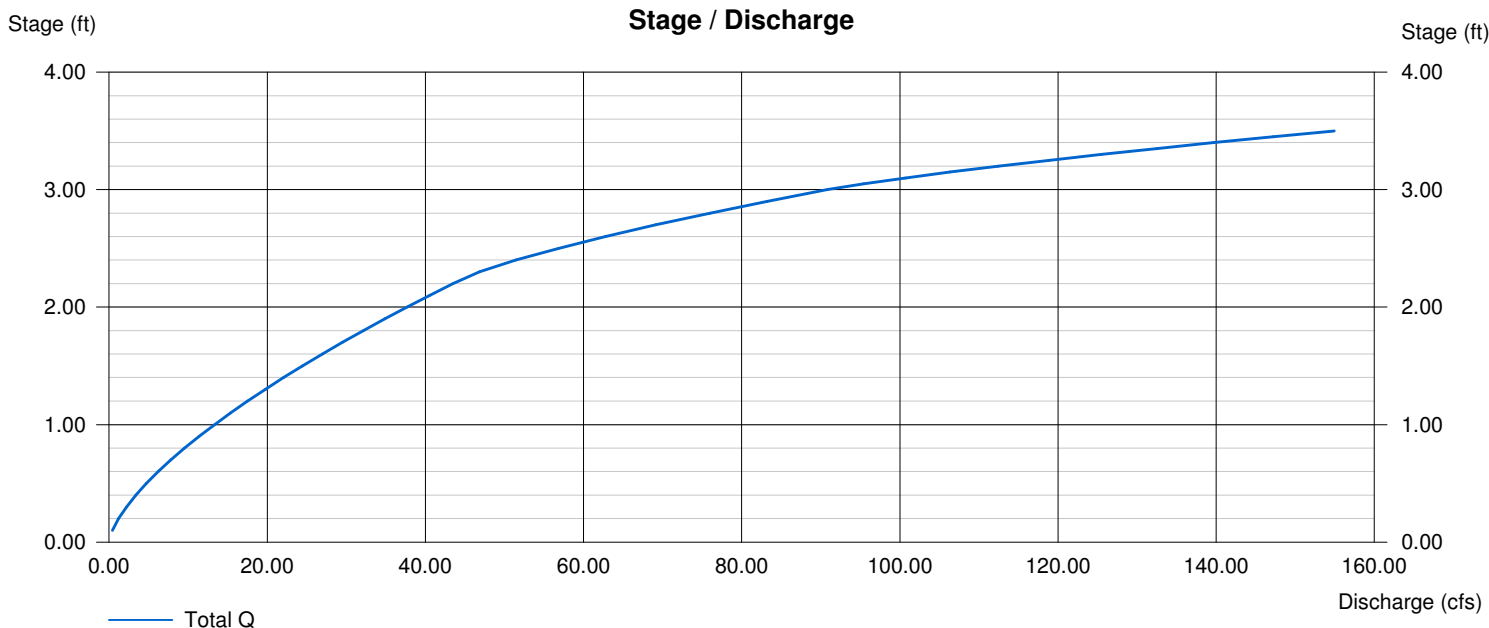


Figure 3.3

Pipe Sizing Calculations

**NORTHEAST BASEBALL COMPLEX
WICHITA, SEDGWICK COUNTY, KANSAS
PRELIMINARY STORM SEWER DESIGN
BY THE RATIONAL METHOD**

Project Number: 0501010103
Soil Group: D
Mannings "n": 0.013

Area ID	Area ac	Accum. Area ac	Land Use	% Impermeable	Runoff Coefficients				Time of Concentration SCS Watershed Method			Rainfall Intensity				Storm Flows					Pipe Sizing											
					C2	C5	C10	C100	CN	Elev. Max	Elev. Min	Flow Length	Watershed Slope	S	Lag (hrs)	Lag factor	Tc (min)	Tc (min)	I2 (in/hr)	I5 (in/hr)	I10 (in/hr)	I100 (in/hr)	O2 cfs	O5 cfs	O10 cfs	O100 cfs	Design Storm	Design Pipe Size (in)	Design Slope (%)	Minimum Slope (%)	Design Velocity (fps)	Capacity of Design Pipe (cfs)
A	1.28		Playgrounds	15	0.33	0.35	0.42	0.55	84	204	201.0	200	1.50	1.90	0.06	0.84	5.28	15	3.83	4.56	5.22	7.37	1.62	2.04	2.81	5.19	5	12	0.40	0.33	2.9	2.3
SW TRENCH DRAINS	1.35		Playgrounds	15	0.33	0.35	0.42	0.55	84	204	201.0	200	1.50	1.90	0.06	0.84	5.28	15	3.83	4.56	5.22	7.37	1.71	2.15	2.96	5.47	5	12	0.40	0.37	2.9	2.3
A+SW TRENCH	2.63		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	3.32	4.20	5.77	10.66	5	15	0.50	0.42	3.7	4.6
B	1.27		Playgrounds	15	0.33	0.35	0.42	0.55	84	204	201.0	270	1.11	1.90	0.09	0.84	7.80	15	3.83	4.56	5.22	7.37	1.61	2.03	2.78	5.15	5	12	0.40	0.32	2.9	2.3
A+SW TRENCH+B	3.90		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	4.93	6.22	8.55	15.81	5	18	0.40	0.35	3.8	6.6
C	1.19		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	200.0	210	0.95	1.90	0.08	0.84	6.89	15	3.83	4.56	5.22	7.37	1.50	1.90	2.61	4.82	5	12	0.32	0.28	2.6	2.0
A+SW TRENCH+B+C	5.09		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	6.43	8.12	11.16	20.63	5	24	0.25	0.13	3.6	11.3
D	1.50		Playgrounds	15	0.33	0.35	0.42	0.55	84	203	201.0	250	0.80	1.90	0.10	0.84	8.64	15	3.83	4.56	5.22	7.37	1.90	2.39	3.29	6.08	5	15	0.40	0.14	3.3	4.1
A+SW TRENCH+B+C+D	6.59		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	8.33	10.52	14.45	26.71	5	24	0.32	0.22	4.1	12.8
E	0.54		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	200.0	180	1.11	1.90	0.07	0.84	5.64	15	3.83	4.56	5.22	7.37	0.68	0.86	1.18	2.19	5	12	0.25	0.06	2.3	1.8
A+SW TRENCH+B+C+D+E	7.13		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	9.01	11.38	15.63	28.90	5	24	0.32	0.25	4.1	12.8
F	1.02		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	201.0	160	0.63	1.90	0.08	1.84	14.98	15	3.83	4.56	5.22	7.37	1.29	1.63	2.24	4.13	5	12	0.25	0.21	2.3	1.8
G	1.00		Playgrounds	15	0.33	0.35	0.42	0.55	84	205	201.0	230	1.74	1.90	0.07	2.84	18.53	19	3.51	4.20	4.83	6.84	1.16	1.47	2.03	3.76	5	12	0.25	0.17	2.3	1.8
F+G	2.02		Playgrounds	15	0.33	0.35	0.42	0.55	84									19	3.51	4.20	4.83	6.84	2.34	2.97	4.10	7.60	5	15	0.25	0.21	2.6	3.2
NW TRENCH DRAIN	1.56		Playgrounds	15	0.33	0.35	0.42	0.55	84	203	201.0	200	1.00	1.90	0.08	0.84	6.46	15	3.83	4.56	5.22	7.37	1.97	2.49	3.42	6.32	5	15	0.25	0.15	2.6	3.2
H	2.18		Playgrounds	15	0.33	0.35	0.42	0.55	84	206	200.0	315	1.90	1.90	0.08	0.84	6.74	15	3.83	4.56	5.22	7.37	2.76	3.48	4.78	8.84	5	15	0.32	0.29	3.0	3.7
F+G+NW TRENCH+H	5.76		Playgrounds	15	0.33	0.35	0.42	0.55	84									19	3.51	4.20	4.83	6.84	6.67	8.47	11.68	21.67	5	24	0.32	0.14	4.1	12.8
I	0.95		Playgrounds	15	0.33	0.35	0.42	0.55	84	203	200.0	310	0.97	1.90	0.11	0.84	9.33	15	3.83	4.56	5.22	7.37	1.20	1.52	2.08	3.85	5	12	0.25	0.18	2.3	1.8
A+SW TRENCH+B+C+D+E+NW TRENCH+F+G+H+I	13.84		Playgrounds	15	0.33	0.35	0.42	0.55	84									19	3.51	4.20	4.83	6.84	16.03	20.34	28.08	52.07	5	30	0.32	0.25	4.7	23.2
J	2.09		Playgrounds	15	0.33	0.35	0.42	0.55	84	205	201.0	460	0.87	1.90	0.16	0.84	13.50	15	3.83	4.56	5.22	7.37	2.64	3.34	4.58	8.47	5	15	0.32	0.27	3.0	3.7
K	1.21		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	200.0	300	0.67	1.90	0.13	0.84	10.95	15	3.83	4.56	5.22	7.37	1.53	1.93	2.65	4.90	5	12	0.32	0.29	2.6	2.0
J+K	3.30		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	4.17	5.27	7.23	13.38	5	18	0.32	0.25	3.4	5.9
L	2.44		Playgrounds	15	0.33	0.35	0.42	0.55	84	204	199.0	600	0.83	1.90	0.20	0.84	17.05	17	3.61	4.31	4.95	7.00	2.91	3.68	5.07	9.39	5	15	0.40	0.32	3.3	4.1
M	5.06		Playgrounds	15	0.33	0.35	0.42	0.55	84	209	198.0	640	1.72	1.90	0.15	1.84	27.39	27	2.84	3.43	3.98	5.69	4.74	6.07	8.46	15.84	5	18	0.40	0.33	3.8	6.6
J+K+L+M	10.80		Playgrounds	15	0.33	0.35	0.42	0.55	84									27	2.84	3.43	3.98	5.69	10.12	12.97	18.05	33.80	5	24	0.40	0.33	4.6	14.3
SE TRENCH DRAIN	1.21		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	201.0	150	0.67	1.90	0.07	0.84	6.29	15	3.83	4.56	5.22	7.37	1.53	1.93	2.65	4.90	5	12	0.32	0.29	2.6	2.0
N	2.60		Playgrounds	15	0.33	0.35	0.42	0.55	84	202	198.0	380	1.05	1.90	0.13	0.84	10.53	15	3.83	4.56	5.22	7.37	3.29	4.15	5.70	10.54	5	15	0.50	0.41	3.7	4.6
SE TRENCH+N	3.81		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	4.82	6.08	8.35	15.44	5	18	0.40	0.34	3.8	6.6
L+K+L+M+SE TRENCH+N	14.61		Playgrounds	15	0.33	0.35	0.42	0.55	84									27	2.84	3.43	3.98	5.69	13.69	17.54	24.42	45.72	5	24	0.75	0.60	6.2	19.6
O	1.64		Playgrounds	15	0.33	0.35	0.42	0.55	84	200	197.0	210	1.43	1.90	0.07	0.84	5.62	15	3.83	4.56	5.22	7.37	2.07	2.62	3.60	6.65	5	15	0.25	0.16	2.6	3.2
L+K+L+M+SE TRENCH+N+O	16.25		Playgrounds	15	0.33	0.35	0.42	0.55	84									27	2.84	3.43	3.98	5.69	15.23	19.51	27.16	50.85	5	30	0.25	0.23	4.2	20.5
P	3.26		Playgrounds	15	0.33	0.35	0.42	0.55	84	212	198.0	820	1.71	1.90	0.18	0.84	15.30	15	3.83	4.56	5.22	7.37	4.12	5.20	7.15	13.21	5	18	0.32	0.25	3.4	5.9
NE TRENCH DRAIN	0.47		Playgrounds	15	0.33	0.35	0.42	0.55	84	200	199.0	150	0.67	1.90	0.07	0.84	6.29	15	3.83	4.56	5.22	7.37	0.59	0.75	1.03	1.91	5	12	0.25	0.04	2.3	1.8
Q	2.18		Playgrounds	15	0.33	0.35	0.42	0.55	84	200	197.0	220	1.36	1.90	0.07	0.84	5.97	15	3.83	4.56	5.22	7.37	2.76	3.48	4.78	8.84	5	15	0.32	0.29	3.0	3.7
P+NE TRENCH+Q	5.91		Playgrounds	15	0.33	0.35	0.42	0.55	84									15	3.83	4.56	5.22	7.37	7.47	9.43	12.96	23.96	5	24	0.25	0.17	3.6	11.3

Tab 4. Floodplain Submittal

There is currently an unstudied branch of a floodplain running through the site. A HEC-RAS model has been produced with the supporting TR-20 calculations to determine a base flood elevation, as well as a LOMA has been sent to FEMA for their approval. The HEC-RAS drawing with the base flood elevations, HEC-RAS model and TR-20 outputs can be found on the subsequent pages in Tab 4. The floodplain boundaries are outlined in the FIRM Map located in Figure 2.3.

5/14/2007

**Time of Concentration Calculations
Northeast Baseball Complex**

Soil Group D

Area Name	Pre-Project	C	Maximum Elevation	Minimum Elevation	H	Flow Length (L)	T _c Calc	T _c
Tr-20		0.30	226.0	193.0	33.0	3720	91.41	91

*****80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY*****

```

JOB TR-20                FULLPRINT          SUMMARY    NOPLOTS
TITLE 001 NE BASEBALL EXISTING CONDITIONS  MAY 2007
TITLE NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STORM ZONE
4 DIMHYD                0.020                                484
  8 .000 .030 .100 .190 .310
  8 .470 .660 .820 .930 .990
  8 1.000 .990 .930 .860 .780
  8 .680 .560 .460 .390 .330
  8 .280 .241 .207 .174 .147
  8 .126 .107 .091 .077 .066
  8 .055 .047 .040 .034 .029
  8 .025 .021 .018 .015 .013
  8 .011 .009 .008 .007 .006
  8 .005 .004 .003 .002 .001
  8 .000 .000 .000 .000 .000
9 ENDTBL
5 RAINFL 7              0.5
  8 .000 .002 .005 .009 .013
  8 .018 .023 .029 .035 .042
  8 .050 .059 .068 .078 .089
  8 .101 .114 .128 .144 .162
  8 .183 .208 .244 .339 .723
  8 .773 .802 .825 .844 .861
  8 .876 .890 .903 .914 .924
  8 .934 .943 .951 .959 .966
  8 .972 .977 .982 .986 .990
  8 .993 .996 .998 1.000 1.000
9 ENDTBL
6 RUNOFF 1 001          1 0.1478      78.0      1.52              1
  ENDDATA
7 INCREM 6              0.10
7 COMPUT 7 001 001 0.0 3.50 1.0 7 2 11 01 2YR
  ENDCMP 1
7 COMPUT 7 001 001 0.0 4.55 1.0 7 2 12 02 5YR
  ENDCMP 1
7 COMPUT 7 001 001 0.0 5.25 1.0 7 2 13 03 10YR
  ENDCMP 1
7 COMPUT 7 001 001 0.0 7.10 1.0 7 2 14 04 50YR
  ENDCMP 1
7 COMPUT 7 001 001 0.0 7.80 1.0 7 2 15 05
100YR
  ENDCMP 1
7 COMPUT 7 001 001 0.0 9.35 1.0 7 2 16 06
500YR
  ENDCMP 1
  ENDJOB 2

```

*****END OF 80-80 LIST*****

1

TR20 ----- SCS -
NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
15:27:36 PASS 1 JOB NO. 1 PAGE 1

COMPUTER PROGRAM FOR PROJECT FORMULATION - HYDROLOGY USER NOTES

The Users' Manual for this program is SCS Technical Release 20 (TR-20), dated April 1990. The TR-20 program is no longer supported on the mainframe since all

post 1986 program changes have only been in the IBM compatible microcomputer environment.

Compatible input and data check programs are TR20INPT.EXE, version III, dated 01/30/90 and TR20CK.EXE, version II, which is forthcoming.

Major changes from the 1986 TR-20 microcomputer version are:

HYDROGRAPH GENERATION: program procedure to develop runoff hydrographs revised to preserve total hydrograph volume as well as the peak discharge. Hydrographs can contain up to four hundred main time increment points from the beginning of runoff.

ATTKIN ROUTING: separate channel and floodplain lengths can be entered to define additional storage in meandering channels below the representative low ground elevation. Program changes have been made to better handle multiple peaked hydrographs.

FLOW DURATION: can be obtained if requested.

OUTPUT 80 COLUMNS: Output fits 80 column paper. Hydrograph coordinates over 100 cfs are rounded and shown as whole numbers.

ERRORS, WARNINGS, AND MESSAGES: expanded and updated.

LIST OPTIONS: can print all or selected parts of input data.

INTERMEDIATE PEAKS: requires new IPEAKS record.

1

TR20 ----- SCS -
NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
15:27:36 PASS 1 JOB NO. 1 PAGE 2

DIMENSIONLESS HYDROGRAPH TABLE ENTERED

8	.0000	.0300	.1000	.1900	.3100
8	.4700	.6600	.8200	.9300	.9900
8	1.0000	.9900	.9300	.8600	.7800
8	.6800	.5600	.4600	.3900	.3300
8	.2800	.2410	.2070	.1740	.1470
8	.1260	.1070	.0910	.0770	.0660
8	.0550	.0470	.0400	.0340	.0290
8	.0250	.0210	.0180	.0150	.0130
8	.0110	.0090	.0080	.0070	.0060
8	.0050	.0040	.0030	.0020	.0010
8	.0000	.0000	.0000	.0000	.0000

9 ENDTBL

COMPUTED TIME INCREMENT = .0200

COMPUTED PEAK RATE FACTOR = 484.000

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 PASS 1 JOB NO. 1 PAGE 3

EXECUTIVE CONTROL INCREM MAIN TIME INCREMENT = .100 HOURS

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 2YR
 STARTING TIME = .00 RAIN DEPTH = 3.50 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. =11 STORM NO. = 1 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
 INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.72	58.5	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 1.50 WATERSHED INCHES; 143 CFS-HRS; 11.8 ACRE-FEET.

--- XSECTION 1, ALTERNATE 11, STORM 1, HYDROGRAPH ADDED TO READHD FILE ---

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 1

1

TR20 ----- SCS -
NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
15:27:36 PASS 2 JOB NO. 1 PAGE 4

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 5YR
STARTING TIME = .00 RAIN DEPTH = 4.55 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. =12 STORM NO. = 2 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.71	92.9	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.34 WATERSHED INCHES; 223 CFS-HRS; 18.4 ACRE-FEET.

--- XSECTION 1, ALTERNATE 12, STORM 2, HYDROGRAPH ADDED TO READHD FILE ---

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 2

1

TR20 ----- SCS -
NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
15:27:36 PASS 3 JOB NO. 1 PAGE 5

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 10YR
STARTING TIME = .00 RAIN DEPTH = 5.25 RAIN DURATION = 1.00
ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
ALTERNATE NO. =13 STORM NO. = 3 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.70	116.9	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
2.93 WATERSHED INCHES; 279 CFS-HRS; 23.1 ACRE-FEET.

--- XSECTION 1, ALTERNATE 13, STORM 3, HYDROGRAPH ADDED TO READHD FILE ---

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 3

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 PASS 4 JOB NO. 1 PAGE 6

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 50YR
 STARTING TIME = .00 RAIN DEPTH = 7.10 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. =14 STORM NO. = 4 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
 INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.69	182.2	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 4.56 WATERSHED INCHES; 435 CFS-HRS; 36.0 ACRE-FEET.

--- XSECTION 1, ALTERNATE 14, STORM 4, HYDROGRAPH ADDED TO READHD FILE ---

EXECUTIVE CONTROL EMDCMP COMPUTATIONS COMPLETED FOR PASS 4

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 PASS 5 JOB NO. 1 PAGE 7

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 100YR
 STARTING TIME = .00 RAIN DEPTH = 7.80 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. =15 STORM NO. = 5 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
 INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.69	207.5	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 5.21 WATERSHED INCHES; 497 CFS-HRS; 41.0 ACRE-FEET.

--- XSECTION 1, ALTERNATE 15, STORM 5, HYDROGRAPH ADDED TO READHD FILE ---

EXECUTIVE CONTROL ENDCMP COMPUTATIONS COMPLETED FOR PASS 5

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 PASS 6 JOB NO. 1 PAGE 8

EXECUTIVE CONTROL COMPUT FROM XSECTION 1 TO XSECTION 1 500YR
 STARTING TIME = .00 RAIN DEPTH = 9.35 RAIN DURATION = 1.00
 ANT. RUNOFF COND. = 2 MAIN TIME INCREMENT = .100 HOURS
 ALTERNATE NO. =16 STORM NO. = 6 RAIN TABLE NO. = 7

OPERATION RUNOFF XSECTION 1
 OUTPUT HYDROGRAPH = 1 AREA = .15 SQ MI
 INPUT RUNOFF CURVE = 78. TIME OF CONCENTRATION = 1.52 HOURS
 COMPUTED INTERNAL TIME INCREMENT = .0960 HOURS

PEAK TIME(HRS)	PEAK DISCHARGE(CFS)	PEAK ELEVATION(FEET)
12.68	264.4	(RUNOFF)

RUNOFF ABOVE BASEFLOW (BASEFLOW = .00 CFS)
 6.65 WATERSHED INCHES; 635 CFS-HRS; 52.5 ACRE-FEET.

--- XSECTION 1, ALTERNATE 16, STORM 6, HYDROGRAPH ADDED TO READHD FILE ---

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 SUMMARY, JOB NO. 1 PAGE 9

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
RAINFALL OF 3.50 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
RAINTABLE NUMBER 7, ARC 2							
MAIN TIME INCREMENT .100 HOURS							
ALTERNATE 11 STORM 1							
XSECTION	1	RUNOFF	.15	1.50	---	12.72	59 393.3
RAINFALL OF 4.55 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
ALTERNATE 12 STORM 2							
XSECTION	1	RUNOFF	.15	2.34	---	12.71	93 620.0
RAINFALL OF 5.25 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
ALTERNATE 13 STORM 3							
XSECTION	1	RUNOFF	.15	2.93	---	12.70	117 780.0
RAINFALL OF 7.10 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
ALTERNATE 14 STORM 4							
XSECTION	1	RUNOFF	.15	4.56	---	12.69	182 1213.3
RAINFALL OF 7.80 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.							
ALTERNATE 15 STORM 5							
XSECTION	1	RUNOFF	.15	5.21	---	12.69	208 1386.7

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 SUMMARY, JOB NO. 1 PAGE 10

SUMMARY TABLE 1

SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL IN ORDER PERFORMED.
 A CHARACTER FOLLOWING THE PEAK DISCHARGE TIME AND RATE (CFS) INDICATES:
 F-FLAT TOP HYDROGRAPH T-TRUNCATED HYDROGRAPH R-RISING TRUNCATED HYDROGRAPH

XSECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE			
				ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)

RAINFALL OF 9.35 inches AND 24.00 hr DURATION, BEGINS AT .0 hrs.

ALTERNATE 16 STORM 6

XSECTION	1	RUNOFF	.15	6.65	---	12.68	264	1760.0
----------	---	--------	-----	------	-----	-------	-----	--------

1

TR20 ----- SCS -
 NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
 05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST
 15:27:36 SUMMARY, JOB NO. 1 PAGE 11

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
 QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....				
		1	2	3	4	5

XSECTION	1	.15				
----------	---	-----	--	--	--	--

ALTERNATE	11	59	*****	*****	*****	*****
ALTERNATE	12	*****	93	*****	*****	*****
ALTERNATE	13	*****	*****	117	*****	*****
ALTERNATE	14	*****	*****	*****	182	*****
ALTERNATE	15	*****	*****	*****	*****	208

SUMMARY TABLE 3

STORM DISCHARGES (CFS) AT XSECTIONS AND STRUCTURES FOR ALL ALTERNATES
QUESTION MARK (?) AFTER: OUTFLOW PEAK - RISING TRUNCATED HYDROGRAPH.

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS.....
XSECTION 1	.15	6

ALTERNATE 16		264

1
TR20 ----- SCS -
NE BASEBALL EXISTING CONDITIONS MAY 2007 VERSION
05/11/** NEEEXIST.T20 50%, 20%, 10%, 2%, 1%, AND 0.2% ANNUAL CHANCE STO2.04TEST

END OF 1 JOBS IN THIS RUN

SCS TR-20, VERSION 2.04TEST
FILES

INPUT = neexist.t20 , GIVEN DATA FILE
OUTPUT = neexist.OUT , DATED 05/11/**,15:27:36

FILES GENERATED - DATED 05/11/**,15:27:36

FILE neexist.TRD CONTAINS READHD INFORMATION

FILE neexist.TMG CONTAINS MESSAGE + WARNING INFORMATION

TOTAL NUMBER OF WARNINGS = 1, MESSAGES = 0

*** TR-20 RUN COMPLETED ***

HEC-RAS Plan: Exist River: River Reach: Reach Profile: PF 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	975.6467	PF 1	208.00	196.89	197.46	197.33	197.53	0.006089	2.10	100.10	254.16	0.59
Reach	463.5788	PF 1	208.00	194.97	195.72		195.77	0.002197	1.72	124.86	217.92	0.38
Reach	6.608423	PF 1	208.00	193.58	194.55	194.24	194.61	0.003004	2.00	105.97	183.17	0.44

NEBB.rep

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX   XXXX       XXXX       XX       XXXX
X      X  X       X      X       X      X       X      X
X      X  X       X      X       X      X       X      X
XXXXXXXX XXXX     X      XXX  XXXX     XXXXXX     XXXX
X      X  X       X      X      X      X      X      X
X      X  X       X      X      X      X      X      X
X      X  XXXXXX   XXXX     X      X      X      X      XXXXX

```

PROJECT DATA

Project Title: NEBB
Project File : NEBB.prj
Run Date and Time: 5/14/2007 8:10:52 AM

Project in English units

PLAN DATA

Plan Title: Existing
Plan File : k:\WP\PROJECT\2006\06403 - CPYS - NEBB\Drng\NEBB.p01

Geometry Title: Existing
Geometry File : k:\WP\PROJECT\2006\06403 - CPYS - NEBB\Drng\NEBB.g01

Flow Title : Existing100
Flow File : k:\WP\PROJECT\2006\06403 - CPYS - NEBB\Drng\NEBB.f01

Plan Summary Information:

Number of:	Cross Sections =	3	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Existing100

Flow File : k:\WP\PROJECT\2006\06403 - CPYS - NEBB\Drng\NEBB.f01

Flow Data (cfs)

```

*****
* River          Reach          RS          *          PF 1 *
* River          Reach          975.6467*          208 *
*****

```

Boundary Conditions

```

*****
*****
* River          Reach          Profile          *          Upstream
  Downstream    *
*****
* River          Reach          PF 1          *          Normal S = 0.003
  Normal S = 0.003 *
*****
*****

```

GEOMETRY DATA

Geometry Title: Existing
 Geometry File : k:\WP\PROJECT\2006\06403 - CPYS - NEBB\Drng\NEBB.g01

CROSS SECTION

RIVER: River
 REACH: Reach RS: 975.6467

INPUT

Description:

Station Elevation Data		num= 79	
Sta	Elev	Sta	Elev
0	199.6	154.4	199
154.53	199	155.22	199
158.39	199	164.39	199
359.78	198.03	365.37	198
426.82	197	428.17	197
436.94	197	439.68	197
448.35	197	450.22	197
456.5	197	459.84	197
471.19	197	472.38	197
482.35	197	566.74	197
594.24	196.95	598.39	197
617.49	197.15	620.56	197.18
650.48	197.45	656.62	197.5
691.28	197.8	712.93	197.98
747.26	198.23	763	198.34
830.55	198.85	849.96	199
			903.25
			199.55
			932.83
			199.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val
0	.03	472.38	.03
		656.62	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	472.38	656.62		515.58	512.07	523.92	.1
							.3

CROSS SECTION

RIVER: River
 REACH: Reach RS: 463.5788

INPUT

Description:

Station Elevation		Data		num= 142		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	198.48	3.84	198.45	47.91	198	60.67	198	61.21	198		
70.02	198	70.3	198	74.49	198	81.54	197.91	82.02	197.91		
95.81	197.77	103.55	197.7	110.14	197.65	111.27	197.65	115.28	197.61		
117.06	197.61	118.86	197.61	120.32	197.59	121.59	197.59	123.62	197.57		
126.73	197.57	128.61	197.55	133.37	197.55	179.17	197	194.95	197		
196.53	197	204.78	197	205.71	197	208.24	197	216.86	197		
220.15	197	226.26	197	229.38	197	229.67	197	229.85	197		
232.24	197	238.21	197	240.51	197	245.23	197	252.48	197		
257.58	197	264.47	197	267.95	197	273	197	273.07	197		
273.24	197	273.49	197	273.76	197	275.14	197	275.62	196.99		
275.71	196.99	382.19	196	382.51	196	388.19	196	389.44	196		
397.47	196	399.3	196	403.17	195.92	423.39	195.48	446.94	195		
455.62	195	456.06	195	456.78	195	480.28	195	482.43	195		
501	195	504.91	195	506.71	195	515.4	195	517.7	195		
535.28	195	563.47	195	569.2	194.97	573.25	195	581.02	195.11		
581.59	195.11	583.86	195.14	585	195.15	588.31	195.2	589.9	195.21		
593.14	195.25	595.04	195.28	595.15	195.28	596.65	195.29	600.27	195.33		
604.78	195.39	606.33	195.4	648.56	195.97	650.43	196	651.59	196		
652.92	196	653.94	196	656.51	196	658.39	196	663.47	196		
666.28	196	672.83	196	676.35	196	679.53	196	682.06	196		
684.42	196	684.7	196	684.72	196	684.75	196.01	684.81	196.01		
684.89	196.01	684.96	196.01	685.02	196.01	685.16	196.01	686.92	196.04		
751.95	197	754.14	197	761.67	197.13	762.97	197.15	764.66	197.17		
778.25	197.4	780.85	197.43	785.81	197.5	791.39	197.59	801.55	197.71		
816.7	197.88	827.07	198	829.21	198.01	829.35	198.01	829.51	198.01		
838.78	198.06	844.64	198.1	861.34	198.2	863.93	198.22	892.42	198.37		
894.92	198.39	927.24	198.63	928.07	198.63	935.3	198.69	942.65	198.74		
944.84	198.75	959.58	198.86	978.29	199	994.52	199.12	998.23	199.15		
1032.67	199.4	1043.93	199.48								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.03	403.17	.03	595.04	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 403.17 595.04 408.71 456.97 475.27 .1 .3

CROSS SECTION

RIVER: River
 REACH: Reach RS: 6.608423

INPUT

Description:

Station Elevation		Data		num= 90		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	197	.77	197	.88	197	5.47	196.93	9.89	196.87		
11.19	196.84	14.14	196.8	17.63	196.74	23.82	196.64	31.85	196.5		
60.47	196	60.63	196	60.93	196	61.14	196	61.77	196		

NEBB.rep

62.16	196	62.53	196	62.88	196	75.87	195.81	78.49	195.77
79.46	195.76	81.02	195.75	82.85	195.73	172.25	194.69	213.9	194.2
222.73	194.11	233.11	194	237.84	193.92	239.38	193.89	244.69	193.79
246.02	193.75	249.9	193.69	251.1	193.66	251.56	193.67	305.23	193.58
308.01	193.61	310.65	193.64	312.27	193.66	327.45	194	328.97	194
332.16	194	332.94	194	333.57	194	334.05	194	345.39	194.21
347.25	194.24	397.96	195	398.08	195	398.3	195	398.57	195
398.79	195	399.85	195	400.5	195	400.94	195	401.34	195
401.91	195	407.35	195.12	408.05	195.14	409.34	195.16	415.25	195.31
446.96	196	447.93	196	448.75	196	448.93	196	449.28	196
450.48	196	450.83	196	451.33	196	451.72	196	453.43	196
454.41	196	455.05	196	456.41	196	458.66	196	458.69	196
459.03	196.01	465.35	196.16	468.76	196.24	471.61	196.33	474.66	196.42
476.88	196.5	495.56	197	496.44	197	497.8	197	498.77	197
500.72	197	503.08	197	507.22	197	507.96	197	509.31	197.03

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .03 172.25 .03 347.25 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 172.25 347.25 14.61 6.61 15.18 .1 .3

SUMMARY OF MANNING'S N VALUES

River: River

 * Reach * River Sta. * n1 * n2 * n3 *

 *Reach * 975.6467 * .03* .03* .03*
 *Reach * 463.5788 * .03* .03* .03*
 *Reach * 6.608423 * .03* .03* .03*

SUMMARY OF REACH LENGTHS

River: River

 * Reach * River Sta. * Left * Channel * Right *

 *Reach * 975.6467 * 515.58* 512.07* 523.92*
 *Reach * 463.5788 * 408.71* 456.97* 475.27*
 *Reach * 6.608423 * 14.61* 6.61* 15.18*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: River

 * Reach * River Sta. * Contr. * Expan. *

 *Reach * 975.6467* .1* .3*
 *Reach * 463.5788* .1* .3*
 *Reach * 6.608423* .1* .3*

Tab 5. Permits

A. US Army Corps of Engineers

Waiting on permit letters from the Army Corp of Engineers.

B. Kansas Department of Agriculture

Watershed is less than 240 acres; therefore, permits are not applicable to this project.

C. Federal Emergency Agency (FEMA)

A LOMA has been sent to FEMA for their approval.

D. Kansas Department of Transportation

Not applicable to this project.

E. Sedgwick County Right-of-way Permit

Not applicable to this project.